

**Predicting the Multi-Level Relationships between Top Management
Team Personality as a Micro Foundation of Dynamic Capabilities,
Learning and Firm Performance.**

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Abstract

The current study provides empirical evidence and an empirical examination of the micro-foundations of dynamic capabilities through an examination of dynamic managerial capabilities and Chief Executive Officer (CEO) and Top Management Team (TMT) personality. This marks a move away from the inherent theoretical and conceptual nature of the dynamic capabilities literature. It does so by empirically testing the extent to which personality can be used to predict dynamic managerial capabilities. The concept of dynamic managerial capabilities captures the critical role leaders within the firm play. There are no mechanisms that capture dynamic managerial capabilities and this research develops a tool to measure dynamic managerial capabilities at the CEO and TMT level.

Firstly, this research identifies and measures dynamic managerial capabilities at the CEO/TMT level and links the dynamic managerial capabilities of sensing, seizing and transforming to personality. It, in turn provides empirical support that the personality of the CEO/TMT can be used to predict dynamic managerial capabilities within the firm. It therefore positions personality as a micro-level foundation of dynamic capabilities. Secondly, it identifies that dynamic capabilities do not lead to firm performance and this in turn raises concern surrounding the importance placed on dynamic capabilities within the field of strategic management. This research finds no empirical support for a relationship between the capabilities of the TMT to sense, seize and transform and firm performance. Finally, this research provides support for the importance of learning within the firm and identifies that learning is a predictor of firm performance. Learning is therefore shown in this research to be a mechanism through which organisations develop and evolve macro-level dynamic capabilities.

This research therefore contributes to both an understanding as to the role personality plays but also offers a platform from which to measure the dynamic managerial capabilities of sensing, seizing and transforming at the individual and team level. Offering a multi-level exploration, this research offers an empirical examination of personality and dynamic managerial capabilities, which transcends across the organisations in question. The results of this research thus contribute to knowledge in understanding personality as a micro level origin of dynamic capabilities and the utmost importance of learning as a mechanism to support more macro level dynamic capabilities.

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Chapter 1

Introduction

This chapter introduces the main focus of the research and the core concepts of dynamic capabilities, dynamic managerial capabilities, personality and team composition. The aim of this research is to provide empirical validation to support theoretical consideration of the importance of the personality of the chief executive officer and his/her top management team members as a micro-level origin of dynamic capabilities. It does so to build a better understanding of how personality can be used to unravel further the micro foundations of dynamic capabilities. This research contributes to current discussions in the field highlighting the importance of developing dynamic capabilities through an understanding of individuals within the firm and, in particular, those individuals responsible for strategic decision-making within the firm: the top management team.

Addressing the gap highlighted by many, including Eggers and Kaplan (2013), this research measures the personality of key decision-makers within a firm and examines self-reported managerial capabilities within the top management team and self-reported appraisals of organisational learning at middle management levels. Dynamic managerial capabilities are defined as those capabilities which help managers to create, extend and modify the way in which firms perform. It does so through a detailed study of trait personality profiles and the self-reporting of dynamic managerial capabilities of the chief executive officer (CEO), the top management team (TMT) and middle management level (MML), using finance and technology firms within the UK. The personality of TMT members is explored because of the prominent role they play in decision-making within the firm; it is therefore proposed that it is necessary to examine how personality relates to the important and emerging study of dynamic capabilities within the firm. Research in this area will further shed light on the study of the micro-level origins of dynamic capabilities.

1.1 Introduction

As business environments become increasingly dynamic and competitive, accelerated by technological change and greater globalisation, the business arena is often described as being in a state of flux (Schilke, 2014; Li & Liu, 2014). Given the nature of such environmental conditions, a firm's ability to adapt and strategically reconfigure is considered fundamental to competitive success and, importantly, the ability to create a sustainable competitive advantage in modern times (Pandza, Horsburgh, Gorton & Polajnar, 2003). As a result, it is argued that firms need to develop *dynamic capabilities* to equip themselves with the ability to deal with such heightened dynamism (Teece, 2009; Zahra & Sapienza, 2006; Kor & Mesko, 2013). Wang and Ahmed (2007) define dynamic capabilities as 'a firm's behavioural orientation constantly to integrate, reconfigure, renew and recreate its resources and capabilities and, most importantly, upgrade and reconstruct its core capabilities in response to the changing environment to attain and sustain competitive advantage' (p. 35).

Dynamic capabilities reflect multiple capabilities within the firm, which support the ability of the firm to react and adapt to the changing business environment. Conceptually, dynamic capabilities can be studied at two levels within the firm: micro (individual) and macro (organisational). Dynamic capabilities at the macro level can be considered as being built and leveraged through micro-level origins, which in turn promotes the need to understand dynamic capabilities from this important and increasingly influential micro level.

Conceptual work has previously shown that dynamic capabilities are influenced by micro-level origins and, as a result, the role of individual decision-makers has begun to gain attention and assume greater importance in the emerging literature on the micro foundations of dynamic capabilities (Helfat & Peteraf, 2015; Clarysse & Bruneel, 2014; Dixon, Meyer & Day, 2014). Recognising that some managers have *dynamic managerial capabilities* with which to build, integrate and competitively reposition organisational resources and capabilities, Adam and Helfat (2003) note that dynamic managerial capabilities depend, in part, on managerial cognition and, importantly, on individual differences. As

further highlighted in the work of Eggers and Kaplan (2013), this is an area of the dynamic capabilities literature that remains relatively unexplored. Importantly, despite the emergence of increased conceptual and theoretical thought directed towards the micro-foundations of dynamic capabilities, to date no research has addressed the role personality might play as a micro-level origin.

Personality, defined by Atkinson et al. (1996) as 'the distinctive patterns of thought, emotion, and behaviour which define an individual's style of interacting with the social and physical environment' (p. 421), offers a platform from which to explore further how dynamic capabilities originate from individuals within the firm, and this is both conceptually and empirically explored in this research.

Supported with an understanding of personality, this research contributes to a current stream in the field of dynamic capabilities, which argues that such capabilities are embedded in the behaviour of employees, captured more broadly in the study of their micro foundations (Von den Driesch et al., 2015). To explore this behaviour, this research argues that we first need to understand the root cause of behaviour: the personality of individuals. This reflects a current trend across strategic management research, where the importance of psychological orientation is emerging (Hale & Ployhart, 2014; Colbert, Barrick & Bradley, 2014).

1.2 Research Objectives

Most of the studies in the field consist of conceptual discussions and, consequently, empirical studies are rare (Wang & Ahmed, 2007; Narayanan et al., 2009). In particular, those studies exploring the connection between micro and macro linkages in the development of dynamic capabilities are, as referred to by Rodenbach and Brettel (2015) as 'particularly uncommon' (p. 612). Few studies have described how managerial characteristics such as personality influence the development of dynamic capabilities. This is a research gap that

contributes to the current focus on how micro-level origins influence dynamic capabilities within the firm and thus superior competitive performance. This research therefore offers a multi-level, empirical exploration to address this gap. Extending the existing understanding of the role of micro-level origins, it seeks to determine how the personality of the CEO, and his or her TMT, influences dynamic capabilities at the micro level and organisational learning, as reported by the MML within the firm, and how this in turn links to performance. Seven research objectives have been formulated to capture these links, which are illustrated in the conceptual model presented in Figure One.

- 1. To develop a measurement tool to measure dynamic managerial capabilities at the individual CEO level and the TMT level.*
- 2. To explore the relationship between CEO and TMT personality.*
- 3. To explore the relationship between CEO and TMT dynamic managerial capabilities.*
- 4. To explore the relationship between the personalities of the CEO/TMT within the organisation and self-reported dynamic managerial capabilities within the TMT.*
- 5. To examine the relationship between the TMT's self-reporting of dynamic capabilities and organisational learning, as reported by the MML.*
- 6. To explore the relationship between the personality of the CEO/TMT and organisational learning, as reported by the MML.*
- 7. To examine the relationship between dynamic managerial capabilities, learning as reported by the MML, and firm performance.*

1.3 The Psychological Basis of Strategic Management

Traditionally the field of strategic management has been concerned with analytical, rational models and theories that were used to understand how firms inherently compete and sustain competitive advantage, for example, Barney

(1991), Porter (1980) and Wenerfelt (1984). In recent years, there has been a move to identify the behavioural foundations underpinning the organisation (Hodgkinson & Healey, 2011). As reviewed in the work of Hodgkinson and Healey (2011) over the last two decades, a growing body of research has sought to understand how an insight into human psychology can be used to understand the way in which people behave in the firm and, in turn, the way in which firms compete (Crook et al., 2011; Wright & McMahan (2011). Strategic management, as a field, has therefore shifted away from the dominant focus on external environment analysis tools (i.e. Porters Five Forces Model and PEST analysis) to a focus on internal resources and capabilities within the firm (Kor & Mesko, 2013; Collins & Clark, 2003; Bartlett & Ghoshal, 2013). A number of scholars have marked this movement by investigating the cognitive and behavioural processes underpinning those capabilities within the firm that are used to improve firm performance (Adner & Helfat, 2003; Gavetti, 2005; Teece et al., 1997; Winter, 2000; Zollo & Winter, 2002). As a body of research, across the study of dynamic capabilities in particular, steps have been made to provide a platform from which to further explore the psychological basis of strategic management.

1.4 Macro-Level Dynamic Capabilities

Dynamic capabilities are conceptualised and explored on two levels: the micro and the macro level. At the macro level, dynamic capabilities are studied at the organisational, higher-order level. The ability to adapt in changing markets is a crucial challenge for organisations and is an important research theme within the strategic management and organisational theory literature (Combe et al., 2012; Gutierrez & Perez, 2010; Elliott, Gylling & Toivonen, 2012). The modern-day business environment is shaped by technological revolution and dynamism (Wilden et al., 2013) and the increasing nature of strategic discontinuities present within this environment naturally results in changes to the nature of competition within a given industry. Success in the twenty-first century is therefore commonly considered to be dependent upon the ability of the firm to develop and enhance dynamic capabilities (Teece, 2009; Cavusgil & Knight, 2015; Schilke, 2014).

Creating and sustaining dynamic capabilities to compete in increasingly challenging markets is considered by Li and Li (2014) to be the most important question for any firm. Teece et al. (2007) capture this challenging environment in their definition of dynamic capabilities as the ability of the firm 'to integrate, build and reconfigure internal and external competencies to address rapidly changing environments' (p. 12).

As stated in the above definition, dynamic capabilities require firms to integrate, build and reconfigure both internal and external competencies. The three processes of integration, building and reconfiguration provide a higher-order focus whereby firms must be able continually to adapt their competencies to the changing business environment. At the micro level, integration, building and reconfiguration allow the activities of sensing, seizing and transforming to take place (Teece, 2007; Wang & Ahmed, 2007; Barreto, 2010). While the micro-level concepts of sensing, seizing and transforming are introduced in this chapter, the next chapter is used to explore the macro dimensions of integration, building and reconfiguration.

The majority of research exploring dynamic capabilities has viewed them from an organisational, enterprise, higher-order perspective (Zahra, Sapienza, & Davidsson, 2006; Lopez, 2006). Focusing on firm-specific capabilities, the study of dynamic capabilities supports the requirement for firms to develop capabilities that cannot be imitated or easily replicated by others (Barney, 1991; Teece & Pisano, 1994). Without dynamic capabilities, Ambrosini and Bowman (2009) argue that a firm's success would be short-lived if changes in the external environment were to take place. Dynamic capabilities therefore allow a firm continually to gain competitive advantage by focusing upon a fluid and dynamic approach to the external environment. This in turn avoids the likelihood that resources within the firm could become obsolete when environmental changes take place (Winter, 2003; Zollo & Winter, 2002). In order to understand further how to develop and enact dynamic capabilities within the firm, recent interest has been directed towards the way in which an

understanding of human psychology could be used to support the field. This has paved the way for the emerging study of the micro foundations of dynamic capabilities (Teece, 2007; Helfat & Peteraf, 2009; Augier & Teece, 2008).

1.5 The Micro-foundations of Dynamic Capabilities

Exploring dynamic capabilities at the micro level requires looking at individuals within the firm and how their behaviour and actions contribute to the development of dynamic capabilities at the macro level. Teece (2007) defines micro foundations as 'distinct skills, processes, procedures, organisational structures, decision rules and disciplines' (p.1319). It is this detailed, micro-foundation level that is increasingly positioned as forming the basis of the very understanding of how competitive advantage is created.

Presented in Teece's (2007) framework of micro-foundations, he argues that an understanding of the micro foundations of dynamic capabilities rests on positioning the strategist, and thus the key decision-makers, within the firm as cognitive actors. By focusing on managerial micro foundations, the concept of 'managerial cognitive capability' emerges, a term first introduced by Peteraf (2014), who argues that cognition inherently underpins dynamic managerial capabilities and in turn reinforces the need to focus on the human level of dynamic capabilities.

Despite dynamic capabilities being deemed as crucial to competitive success, as a concept they are largely treated as being inherently hidden, intangible and 'black box' in nature (Pavlou & El Sawy, 2011).

Moving away from the higher-order treatment of dynamic capabilities, in a special paper Teece (2012) argued to the strategic management community the need to move towards a focus on individuals within the firm, thus supporting the need to consider the psychological, micro foundations of dynamic

capabilities. Understanding here is thus a central area of focus across the literature and specifically this study. Research in this direction takes the position that dynamic capabilities should be understood by looking at individuals within the firm (Abell, Felin & Foss, 2007; Augier & Teece, 2008; Teece, 2012).

In particular, the micro-foundations framework presented by Teece (2007) refers to those activities that take place at the individual level and ultimately support organisational-level dynamic capabilities: sensing, seizing and transforming. Sensing, seizing and transforming are the activities that underpin and enable the deployment of dynamic capabilities. Faced with increasingly competitive and dynamic business environments, firms must be able to scan, search and explore within their environment in order to identify both opportunities and threats (Day, 2014).

1.5.1 Sensing

Sensing can be defined as the 'identification and assessment of opportunities' (Teece, 2007, p. 22). At the managerial level, Teece (2007) in his work often refers to Ted Turner, the founder of a number of cable channels in the US. He argues that Ted Turner's approach to business epitomises what is required in order to be entrepreneurial in nature. Turner noted that 'the only way we could compete effectively was to take advantage of opportunities before they became obvious' (Turner & Burke, 2008, p. 161). Relating this back to the process of sensing, sensing refers to the activity of identifying and feeling for opportunities within the external environment before they materialise (Denrell, Fang & Winter, 2003). Critical components of dynamic capabilities, managers must be able to scan their environment and use this to sense opportunities before their competitors. This allows the firm to move towards a more sustainable and effective competitive positioning.

At a cognitive level, sensing can be aligned to the cognitive capabilities of perception and attention, which requires managers to be able to scan for

opportunities in often uncertain and highly dynamic conditions. In a similar vein to how differences in cognitive ability may affect how a manager is able to sense opportunities, it is also possible to relate this back to personality. For example, Nadkarni and Herrmann (2010) found that CEOs with a high degree of openness to experience were able to develop broader and more complex mental models, which they could change more frequently compared to CEOs with low levels of openness to experience. Openness to experience is therefore a trait that has been positively related to strategic flexibility and could be theorised as being linked to the individual-level activities of sensing, seizing and transforming.

1.5.2 Seizing

Seizing is the second foundation for dynamic managerial capabilities. Seizing can be defined as 'the mobilization of resources internally and externally to address opportunities and to capture value from doing so' (Teece, 2007, p. 1338). Once opportunities have been sensed by management it is then possible to seize those that might be considered as having the greatest promise. This may require management to make a large strategic investment or to focus upon an investment in new capabilities within the firm (Augier & Teece, 2009). At a cognitive level, the capacity to seize is related to an individual's approach to problem-solving and reasoning (Peteraf, 2014). Problem-solving is often viewed in the literature as something that stems from rational thought and an ability to draw on a variety of perspectives to reach a conclusion. The personality traits of openness to experience and extraversion can, in principle, be related to this. The personality profile of an individual can therefore be tested to see the relationship between personality and the cognitive processes of an individual. Seizing, as a process, can therefore be theorised as depending in part on underlying cognitive capabilities and in part on personality.

1.5.3 Transforming

The third process underlining dynamic managerial capabilities is the extent to which growth can be sustained. Teece (2007) refers to the final stage of transforming as *the continued renewal of the organisation*, which requires individuals to focus continually upon renewal and change. While this final process relates heavily to organisational-level phenomena, it is also still a core area in which the role of key decision-makers is fundamental (Helfat et al., 2007). For example, managers need to ensure that any decisions allow for a renewal of resources, which is best for the firm. The extent to which growth is sustained thus fundamentally relates back to the choices and actions a manager makes and how forward thinking a manager is. Peteraf (2014) argues that the cognitive capabilities of language and communication are inherently important here. The ability to communicate a passion for transformation is fundamental to ensuring this is not contained solely within the TMT. This, in turn, can be related to personality. For example, a highly extraverted individual would be comfortable communicating ideas to lots of people, and this may heighten his or her ability to communicate new initiatives and thus maintain a focus on change within the firm.

The three activities of sensing, seizing and transforming are measured in this study first at the individual level and then aggregated to the team level. This research contributes to the design of a measurement tool to capture sensing, seizing and transforming. Individuals within the TMT are asked to reflect upon how they work together as a TMT and this supports results being aggregated to the team level. By measuring sensing, seizing and transforming in this way, it is possible to make links to the personality of the TMT and how the TMT report sensing, seizing and transforming.

1.6 Cognition and Personality as a Micro-level Origin of Dynamic Capabilities

Management research has long regarded cognition as an important attribute of those at the top of the organisation (Finkelstein, Hambrick & Canella, 2009). Linked to the study of dynamic capabilities, Smith and Tushman (2005) argue that top management cognition can be specifically related to strategic change and that managers need to 'build a paradoxical cognition' (p.522) that enables the dual pursuit of important processes within the organisation, for example, exploring and exploiting new opportunities. Managerial cognition has been widely explored through empirical studies and linked to a number of areas that ultimately drive strategic change (e.g. Boeker, 1997; Wiersema & Bantel, 1992).

While the relationship between cognition and dynamic capabilities is emerging and evident, this research seeks to build on this by exploring the relationship between the personality of an individual decision-maker within the firm and managerial cognitive capability expressed in the form of dynamic managerial capabilities. The micro foundations in this instance are therefore related not only to cognition but also to personality. This is an identified research gap and an area that it is hoped will shed further light on the micro foundations of dynamic capabilities. To date, while personality has been linked to a large number of firm-level outcomes it has not been related to dynamic capabilities. The section below introduces how the personality traits of one individual could be related to managerial cognition to aid understand the expression of personality.

Robbins (2005) defined an individual's personality as the 'combination of psychological traits, which we use to classify that person' (p. 310). Traits can be seen in two ways. First, as 'neuropsychic structures which have a causal influence on behaviour' and second as cognitive categories that allow those observing personality to make sense of an individual and, in turn, the dynamics of personality. Certain personality traits can therefore be related to cognitive processes. Judge and Locke (1993), for example, found that individuals who were high in neuroticism were also more likely to experience dysfunctional job-related thought processes, including dependence on others and perfectionism.

Related to this, this study argues that it is possible to test if the personality traits of an individual can be used to predict dynamic managerial capabilities within the TMT.

Interest in the role of personality in organisational behaviour has grown in recent years and previous research has increasingly suggested that CEO/TMT personality can influence external and internal management outcomes, for example, firm performance/organisational structure (Nadkarni & Herrmann, 2010; Peterson, Walumbwa; Byron & Myrowitz, 2008). A key premise of this research is that those within the TMT have the power to make strategic decisions within the firm. Because of this strategic role there is a need to understand how the TMT behave. By measuring personality, the root cause of behaviour, links can be made between personality and the way dynamic capabilities are enacted at the team level. This is supported by the work of Carpenter et al, (2004), who argue that strategic choices and performance are reflections of the TMT.

Personality is an important way of analysing individuals and groups within the firm and is used in this research to explore individual differences within the TMT and between the CEO and his or her supporting TMT. By examining individual differences in personality at the team level, it is possible to explore the extent to which dynamic managerial capabilities can be predicted, and to gauge how people will behave and how, in turn, dynamic capabilities may be enacted. Examining these differences within the TMT is of particular interest as a result of the power and strategic influence TMTs are considered to have. Further, there is empirical support for the contention that the personality of key decision-makers influences strategic choices, which, in turn, influence firm performance. For example, Chatterjee and Hambrick (2007) suggest that CEOs that are high in neuroticism make bold, risky decisions, which attract attention from organisational members.

This research measures CEO and TMT personality traits using the Five Factor Model (FFM) developed by McCrae and Costa (1987). Personality traits are

defined by McCrae and Costa (1990) as 'dimensions of individual differences in tendencies to show consistent patterns of thoughts, feelings, and actions' (p. 23). The FFM comprises five core personality traits widely considered to offer a comprehensive examination of personality: openness to experience, conscientiousness, extraversion, agreeableness and neuroticism. The rationale behind using the FFM is that it has been proven to be a valid and reliable measurement tool, with many supporting its all-inclusive nature (Barrick & Mount, 1991; Bono & Judge, 2003; Goldberg, 1990). The FFM has also gained support for its robust, comprehensive measurement of personality (Peterson et al., 2003).

The outcomes of the research are intended to promote an understanding of how CEO/TMT personality relates to the enactment of dynamic capabilities. Personality is measured to predict behaviour and thus dynamic managerial capabilities at the TMT level. Helfat and Martin (2015) support this type of research by arguing that uncovering the micro foundations of dynamic capabilities is an increasingly important area in the search for those factors that drive strategic change. While the majority of research on TMTs focuses on demographic factors, this research examines psychological characteristics.

While the field of dynamic capabilities has widely considered cognition to be the basis for dynamic capabilities, very little research to date has addressed the role that the personality of key-decision makers plays and how this relates to dynamic capabilities. This research therefore draws on the role CEOs and TMT members play in driving strategic change (Heyden et al., 2013), and seeks to examine the personality of key decision-makers and how this relates to dynamic managerial capabilities. Links are therefore tested in this research between personality traits and the dynamic managerial capabilities of: sensing, seizing and transforming.

1.7 The Context of Dynamic Capabilities

The very study of dynamic capabilities is related to context and, in particular, the conditions of the external environment (Eisenhardt & Martin, 2000). In addition to dealing with changing environmental conditions within which dynamic capabilities are placed, there is also a need to reflect on the importance of organisations as multi-level, integrated systems (Klein & Kozlowski, 2000).

This research focuses on two industries, which provide the context of the research study: finance and technology. This is aligned to previous research exploring dynamic capabilities, which largely focuses upon these two industries because of the dynamism faced by the firms in such industries (Deeds, DeCarolis & Coombs, 2000; Wang & Ahmed, 2007). This research concentrates upon technology and finance firms as an example of industries facing heightened dynamism and turbulence in the external business environment (Weerawardena et al., 2014; Makkonen, Pohjola, Olkkonen & Koponen, 2014). For example, early dynamic capabilities research focused on technological innovations and therefore used technology firms as an example of firms who make investments in research and development and thus capabilities. Technological change was considered to be most heightened across technology industries and therefore attracted interest from academics (Wang & Ahmed, 2007). Furthermore, finance firms are considered to face highly turbulent environments and thus those environments where dynamic capabilities are most required to secure and maintain competitive success. This is evidenced by a paper by Makkonen, Pohjola, Olkkonen & Koponen (2014), which explores the role dynamic capabilities played in securing stability for finance firms during the financial crisis. Strategic change in this industry is closely linked with capability creation and, most recently, dynamic capability creation.

This study addresses the micro origins of personality and the dynamic managerial capabilities of sensing, seizing and transforming to shed light on more macro-level concepts within the firm: organisational learning and firm performance.

1.8 The Multi-level Firm

Driven by the recognition that micro phenomena, such as the personality and cognitive capabilities of key decision-makers, are embedded in the wider macro context, and that macro phenomena, such as dynamic capabilities, often emerge through the interaction and dynamics of micro elements, this research examines both micro and macro elements, which can be seen in the conceptual model presented in Figure One.

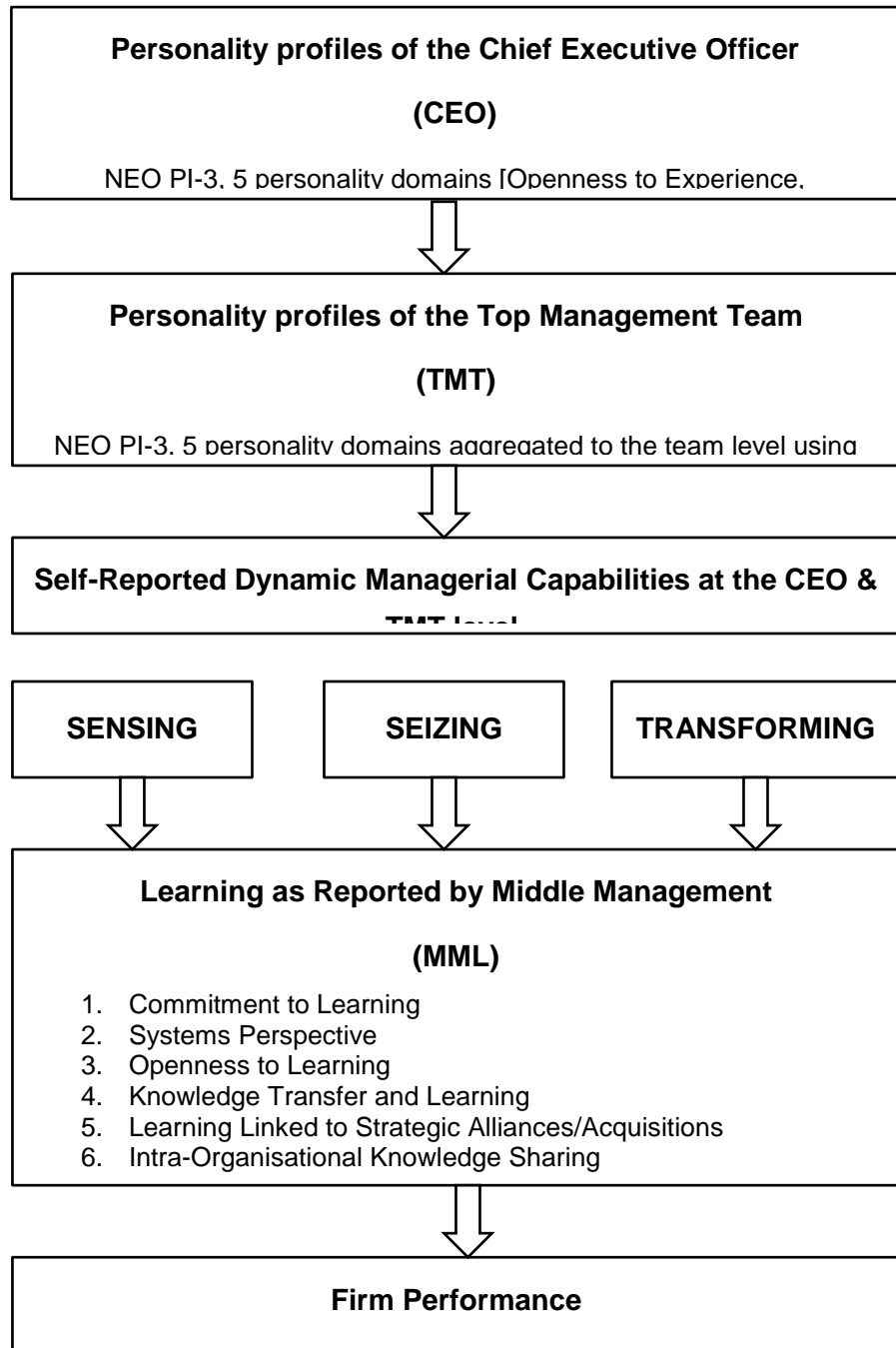
This research explores how the micro elements of the CEO and TMT personality influence dynamic managerial capabilities at the TMT level. Rooted in psychological origins, the micro perspective assumes variations in individuals (Ployhart & Moliterno, 2011) and it is therefore also meaningful to explore dynamic capabilities from this micro perspective. By capturing individual differences it may be possible to see how this is related to the different dynamic managerial capabilities of sensing, seizing and transforming.

Multi-level research seeks to overcome the limitations associated with looking at dynamic capabilities from a single-level perspective. For example, while macro-level dynamic capabilities research, such as that conducted by Vergne and Durand (2011), neglects the means by which individual behaviour interactions give rise to higher-level phenomena, micro-level research, for example, Rodenbach and Brettel (2012), fails to account for contextual factors that may significantly constrain individual differences. By carrying out multi-level research it is possible to try to understand dynamic capabilities from different levels within the firm.

Operationalising this multi-level approach, this research first explores the relationship between self-reported dynamic managerial capabilities and personality across two levels: individual (CEO) and team (TMT). Second, it captures learning at the MML, a macro level dynamic capability, and does so in order then to explore the relationship between dynamic managerial capabilities, learning and firm performance within the firm. The conceptual model shown in

Figure One is multi-level in nature without trying to capture the complexity of the entire organisational system. It therefore focuses on the significant phenomena of personality, dynamic managerial capabilities and learning and conceptualises this at multiple levels (individual, team and organisational). As a result of conceptualising dynamic managerial capabilities at the team level, there is a need to introduce first what is meant by the TMT and second the role team composition plays.

Figure One: Conceptual Model



1.9 Defining the TMT

Based on the seminal work of Thompson (1967), it is widely accepted across the literature that TMTs are responsible for setting the strategic direction of their organisations. While traditionally the TMT was viewed as *the dominant coalition*, thus encompassing the CEO and TMT (Cyert & March, 1962), in more recent definitions the TMT and CEO have been separated. Tushman and Rosenkopf (1996) refer to the TMT as 'CEOs and their direct reports', while West and Anderson (1996) refer to the TMT as 'top managers involved in decision making identified by the CEO' (p.682). In most instances, the TMT is identified by the CEO, and thus the CEO and TMT are considered as being two separate entities (West & Shwenk, 1996; Hambrick et al., 1996; Boeker, 1997).

The decision to treat the TMT as a unit of analysis is driven by the power and influence the TMT as a whole are considered to have on an organisation (Hambrick, Finkelstein & Mooney, 2004). Therefore, in this vein, this research follows the logic that, because the TMT are at a strategic level in the firm they are likely to have an influence on the strategic outcomes of dynamic capabilities.

The CEO is herein separated from the TMT to build on research that considers the CEO as playing a unique role as the most powerful individual in an organisation (Peterson, Galvin & Lange, 2012; Wales, Patel & Lumpkin, 2013; Carpenter, 2011). Quigley and Hambrick (2015) support this contention by considering the CEO to be one of the most pronounced phenomena of recent decades. This increase in attributions of CEO significance is aligned to an increase in empirical studies, which support a variance in performance explained by CEOs (Zacharias, Six, Schiereck & Stock, 2015; Mackey, 2008).

1.10 Team Composition

Within this research, the TMT is treated as an important unit of analysis. This contributes to existing studies in which the TMT has been the object of focus

(Ensley, Pearson & Pearce, 2003; Carpenter, 2002; Hambrick, Cho & Chen, 1996). The TMT is studied as the result of a desire to explore how the personality of individual TMT members and their dynamic managerial capabilities to sense, seize and transform collectively combine at the team level. They are focused upon because of their influence on strategic decision-making throughout the firm (Knight et al., 1999; Costanzo & Domenico, 2014). Actions and behaviours within the TMT can therefore be considered as fundamental to understanding broader organisational actions. When examining the team level, there is a need to have an appreciation of team composition.

Team composition is a fundamental consideration in TMT research; it deals with diversity within the team and the extent to which members of a team are similar or dissimilar across a number of attributes, including gender, age, tenure and team size (Jackson, May & Witney, 1995). This research views the TMT as the unit of analysis in which the TMT are treated as a decision-making unit (Bantel & Jackson, 1989). Self-reported dynamic managerial capabilities and individual personality profiles within this research are therefore measured and aggregated to the team level.

Referring back to the importance of carrying out multi-level research, teams and individuals within the firm are bound together in the multi-level system. As stated by Kozlowski and Bell (2013), 'teams don't behave, individuals do; but they do so in ways that create team level phenomena' (p. 6). This research attributes individual personality and dynamic managerial capabilities to the team collective by examining team personality and team levels of self-reported dynamic managerial capabilities. It does so to understand the nature of team-level phenomena and, in turn, the relationship between personality and dynamic capabilities at this important team level, exploring team-level personality and team dynamic managerial capabilities in order to capture the workings within the important TMT.

Following the introduction of the core concepts of dynamic capabilities, personality and team composition, this chapter now presents the core research

gaps addressed by this research. The conceptual model presented in Figure One aligns with these highlighted research gaps.

1.1.1 Identification of Research Gaps

As highlighted in the work of Peteraf (2014), as a field little is known about how dynamic managerial capabilities interact at the team level. To address this gap, this research explores dynamic managerial capabilities at the TMT level through self-reports on the dynamic managerial capabilities of the team. Furthermore, calls from within the field have articulated the need to understand whether the diversity of TMT members helps or hinders strategic change. Relating this back to the study of personality within this research, personality traits are explored in relation to the three dynamic managerial capabilities of sensing, seizing and transforming. Through this study it is then possible to understand if certain personality traits within the team need to be high in order for one or all of the dynamic managerial capabilities to take place. To facilitate a deeper understanding of dynamic capabilities and managerial change, personality is used to further the link between cognition and dynamic managerial capabilities. Building upon this established link, attention in this study is directed towards the relationship between personality, the expression of personality and thus dynamic managerial capabilities.

Second, at present little is known about the relationships between dynamic managerial capabilities at the TMT level and what we see elsewhere in the firm. To address this, as seen in the conceptual model, the study explores the routines of learning as reported by the MML. This information is captured in order to relate dynamic managerial capabilities to one specific area which will allow links between the dynamic managerial capabilities of sensing, seizing and transforming and dynamic capabilities to be established. This information can again be used to examine the extent to which dynamic managerial capabilities come to life through reporting by the MML within the firm and thus the macro level of dynamic capabilities.

Third, as a field the area of dynamic capabilities is in its infancy and thus in a period of important theoretical development. The attractiveness of the field is well noted and has developed over a short period of time. Few studies offer an empirical examination of dynamic capabilities and, as such, the measurement of dynamic capabilities is vague (Eisenhardt & Martin, 2000). This study therefore seeks to put a measurement tool in place in order to move towards a measurement of dynamic managerial capabilities.

Finally, a further important gap within the research relates to the need to untangle the relationships that exist between micro and macro level dynamic capabilities. Largely unexplored, both theoretically and empirically, the research addresses this gap by examining the relationships between learning and organisational performance. This contributes to understanding the link between the presence of dynamic capabilities and profitability. This is important terrain for future research and paves the way to support further research in this area if empirical evidence can be used to support the link between dynamic capabilities and performance.

1.12 Research Contributions

While many past studies have shed light on the conceptual underpinnings of dynamic capabilities, in order to support this context, attention has been directed towards the micro foundations of dynamic capabilities and, in particular, towards CEOs within the firm (Von den Driesch et al., 2015; Pitelis & Wagner, 2015). While current academics are moving towards the individual measurement of dynamic capabilities, this research offers a platform from which to measure individual proxies for dynamic capabilities by reviewing self-reported levels of sensing, seizing and transforming within the TMT. Supported with an understanding of personality, this research contributes to a current stream in the field of dynamic capabilities, which argues that dynamic capabilities are embedded in the behaviour of employees (Von den Driesch et al., 2015).

The expanding literature based on dynamic capabilities has produced a need for context. The decision to focus upon two industries in the UK is therefore driven by a need to base research contextually on certain industries. By doing so, it is possible to limit those factors that have been shown to influence the extent or nature of dynamic capabilities within the firm. With the idea being solidified that dynamic capabilities are fostered within the firm, this research examines dynamic capabilities from the important human level, which in turn draws on the work of Andersson and Evers (2015), who reviewed the organisational processes of dynamic capability-building within the firm. This then supports future research to explore the differences between stable and dynamic industries.

Finally, the present study is unique in its exploration of the role of personality and the micro foundations of dynamic capabilities. To date, very few empirical studies have examined the relationship between personality and dynamic capabilities. Research in this area could potentially pave the way for a deeper understanding of how the potential for dynamic capabilities within the firm is driven from the individual level and, in particular, the personality of key decision-makers. This research therefore acts as a starting point to review whether there is a relationship between personality and dynamic capabilities and, if so, what this means for the existing dynamic capabilities frameworks and literature.

1.13 Thesis Structure

This thesis consists of seven chapters, including this introductory chapter, which discusses the research background, scope and rationale for the study and outlines the research objectives guiding the research process. This chapter therefore justifies the need to conduct research in this area and introduces the reader to the core concepts inherent in the current study.

Chapter Two reviews the existing literature and provides a detailed overview of the theoretical frameworks of the research: the Five Factor Model (Costa and

McCrae, 1992) and Teece's dynamic capabilities micro-foundation framework of sensing, seizing and transforming (Teece, 2009). A detailed review of existing conceptual and theoretical work allows this research to be placed within the wider demands of the field. Stemming from this chapter, the research gap is identified and then discussed.

Chapter Three describes the research methodology for collecting quantitative data for the stages of data collection, including the procedure for the empirical study and supporting pilot studies. It discusses the research paradigm and the philosophical foundations of the research. The procedures for collecting and analysing the quantitative data are then described.

Chapter Four is dedicated to the development of a new measurement tool to capture sensing, seizing and transforming at the individual level. It outlines the steps and processes taken to design the new measurement tool.

Chapter Five presents the descriptive statistics and findings of the empirical study and is also used to present the correlational effects found across the data. It presents the results of the correlation analysis and multiple regression. Findings from all four stages of the conceptual model are used to determine the core relationships between variables. Chapter Five finishes with a summary of findings.

Chapter Six presents a detailed discussion of the major findings of the research and aligns this to the central research objectives presented in chapter one.

Finally, Chapter Seven presents the theoretical and practical contributions of the study and discusses the limitations of the study alongside aspects and recommendations for future research.

Chapter 2

Literature Review

This chapter reviews the literature on dynamic capabilities, personality, learning and team composition in relation to this research. It begins with a literature review on the concept of dynamic capabilities, exploring their emergence within the field of strategic management and the recent realms of literature exploring their micro-foundations. This is followed by a review of personality literature, which allows for the final section, exploring the conceptual links between personality, dynamic capabilities and learning, to be presented. The chapter in its entirety positions what we already know about dynamic capabilities and personality as two separate concepts, paving the way for an empirical study exploring the relationship between the two, underpinned by the importance of dynamic managerial capabilities in the enactment of dynamic capabilities. The final part of the chapter will summarise the main ideas presented.

2.1 Introduction to Dynamic Capabilities

Strategic management scholars endeavour to understand how one firm outperforms another through the ability to gain and sustain competitive advantage. Competitive advantage, as defined by Peteraf and Barney (2003), is achieved if a firm is 'Able to create more economic value than the marginal (break-even) competitor in its product market' (p.314).

The resource-based view (RBV) of the firm approaches this from an internal perspective, suggesting that the way in which a firm differentiates itself is due to the possession of different resources (Peteraf, 1993; Wernerfelt, 1984). According to Barney (1991), it is those resources that are difficult to imitate or replicate that can particularly help a firm to achieve a superior performance

advantage. This focus on value and difference formed the basis for ongoing research and the insights published by Teece (1982), which eventually led to the development of dynamic capabilities.

Resources consist of the assets and capabilities of a firm. Whereas assets are tangible in nature and easily reproduced by other firms, capabilities offer a more intangible, unique basis from which to compete, and are often viewed and positioned as 'routines' within the firm (Dosi, Nelson & Winter, 2000). Referred to by Itami (1987) as 'invisible assets', capabilities have been widely considered an important, yet difficult, concept to measure (Hitt, Biermant, Shimizu & Kocchar, 2001).

Fuelled by discussions supporting the link between capabilities and firm performance, increased attention has been directed towards the different type of capabilities that may exist within the firm (Chi & Seth, 2009; Morgan, Vorhies & Mason, 2009). For example, Hamel and Prahalad (1990) explained that some capabilities were central to business practice and should therefore be deemed core competencies, including, for example, the corporate imagination of the firm. Hamel and Prahalad (1990) viewed these core competencies as a pre-requisite to the creation of new markets and opportunities. Their work drew on the earlier work of Teece (1986), who had argued that there was a need to leverage and exploit competencies through the use of other capabilities. Teece referred to these other capabilities as 'complementary capabilities', (p. 285). However, while Teece (1986) viewed competitive success as stemming from capabilities within the firm, Hamel and Prahalad (1990) were more assertive in their interpretation, arguing that capabilities and competencies needed to be focused upon to result in the ability of the firm to build and dominate new markets. What both Hamel and Prahalad (1990) and Teece (1986) have in common is an appreciation of the importance of the internal workings of the firm and the presence of capabilities and competencies therein.

Underpinned by strategic practice and thought, as industries and business environments have developed, firms have increasingly had to adapt and align

their assets and capabilities to the needs of the changing market. It is this alignment that has underpinned strategic management thinking and actions over the past two decades (Teece, Pisano & Shuen, 1997). Moving away from the stability of the business environment evident in the 1970s and 80s, the 1990s began to see firms having to deal with industry dynamism (Kim, Suresh & Kocabasoglu-Hillmer, 2013). It was this acceptance that industry dynamism was influencing the strategic direction and actions of some firms that led to a review of how some firms were able to maintain a more competitive stance and advantage than others in light of this increased dynamism. To avoid a detrimental impact on firm performance, firms must continue to adapt strategically. As markets changed and increased emphasis placed on adaptation, Teece, Pisano and Shuen (1997) built on Teece's (1986) earlier thinking and the concept of complementary capabilities, arguing that another complementary capability, dynamic capabilities, was required to cope with such dynamism and, in turn, to support a firm's ability to gain and sustain superior competitive advantage. Considered to be a seminal piece, since the publication of Teece, Pisano and Shuen (1997) the topic has continued to command attention.

Dynamic capabilities are specific strategic processes, which create value within the firm and can therefore be seen as having the potential to move away from the vague interpretations of the RBV. Dynamic capabilities can be defined as 'the firm's ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments (Teece, Pisano & Shuen, 1997, p. 516).

This definition draws on the work of other definitions referred to across the literature, including the work of Schoemaker and Amit (1993) and Kogut and Zander (1992). There has, however, been a slowness to converge on a common, concrete definition of dynamic capabilities, which has resulted in various studies using different definitions throughout the years. Table 1 presents a variety of definitions across the literature. One of the reasons behind a slow convergence of agreed meaning is academics from different research traditions and backgrounds contributing to discussions. While this offers strength in the application and scope of dynamic capabilities and evidences their

importance across disciplines, this has also weakened the specific interpretation and thus subsequent agreement about what is meant by the term dynamic capabilities, fuelling a difficulty in developing specific measurement tools.

The nature of dynamic capabilities, as evidenced in the above definition, connotes change. Dynamic capabilities add something else to ordinary capabilities and are inherently placed within the context of heightened dynamism and thus the need for firms to renew and adapt to the changing business environment. Collis (1994) refers to dynamic capabilities as governing the rate of change of more ordinary capabilities. It is important to note here that the dynamic capabilities framework is arguing not that change can only happen by having dynamic capabilities, but rather that dynamic capabilities are the most important consideration. Winter (2003), for example, claims that while there are many ways to change, the study of dynamic capabilities argues that the most sustainable, competition-oriented forms of change are underpinned by the presence of dynamic capabilities within the firm.

Table 1: Definitions of Dynamic Capabilities

Author(s)	Definition
Lee, Lee and Rho (2002)	'A newer source of competitive advantage in conceptualizing how firms are able to cope with environmental changes.'
Zahra and George (2002)	'Dynamic capabilities are essentially change oriented capabilities that help firms redeploy and reconfigure their resource base to meet evolving customer demands and competitor strategies.'

Winter (2003)	'A dynamic capability is learned and stable patterns of collective activity through which the organisation systematically generates and modifies its operating routines in pursuit of improved effectiveness.'
Helfat et al. (2007)	'Dynamic capabilities as the capacity of an organization to purposely create, extend, or modify its resource base.'
Pavlou and El Sawy (2011)	'As those capabilities that help units extend, modify, and reconfigure their existing operational capabilities into new ones that better match the changing environment.'

2.1.1 The Dynamic Capabilities Framework

It was in the mid-1990s that the concept of dynamic capabilities was introduced as a source of competitive advantage (Teece & Pisano, 1997). The term 'capabilities' places importance on the role of strategic management in facilitating such adaptation. Teece and Pisano (1997, p. 537) view the role of strategic management as 'appropriately adapting, integrating and reconfiguring internal and external organisational skills, resources, and functional competences towards the changing environment'.

Writing in what has widely been considered the most influential paper, Teece et al. (1997) addressed the motivations for the desire to develop the dynamic capabilities framework by stating that it was to 'aid understanding of how and why certain firms build competitive advantage in regimes of rapid change' (p.509). Since the late 1990s the inherent want to understand how to deal with

dynamism has focused upon dynamic capabilities. De Stefano et al. (2010) report that since 2006, more than a hundred papers per year have been published on dynamic capabilities. Barreto (2010) supports this by arguing that since the publication of Teece's paper in 1997, 1,534 articles were published between 1997 and 2007. Writing more recently in 2013, Peteraf, Di Stefano and Verona (2013) note that over a thousand articles have been published in the last decade, thus highlighting the importance of this topic. As a construct, dynamic capabilities seeks to address the criticisms directed towards the RBV as a result of its static nature, which has motivated academics to embrace the construct and further understanding of how firm conditions are changing and the utmost importance this places on dynamic capabilities.

Underpinning the concept of dynamic capabilities is the contention that in order to gain competitive advantage, firms must be able to exploit existing internal, firm-level capabilities while simultaneously developing new ones. This is an idea that was initially developed in the work of Penrose (1959), Teece (1982) and Wernerfelt (1984), with thoughts being related to how a firm should, and can, build distinctive, difficult-to-imitate advantages. It was, however, only in the 1990s that researchers began to focus on how one firm might be able to develop firm-level capabilities that specifically allow it to respond to the dynamics in its business environment more effectively than another. The development of the dynamic capabilities framework has emerged over the years to become a powerful, strategic concept and one that has built its theoretical foundations upon a number of core areas of strategic management, including, most notably, work on the RBV of the firm (Barney, 1986; 1991).

The RBV complemented existing ideas that competitive advantage was driven by industry structure and positioning within the market (Porter, 1979). The RBV assumes that it is possible to conceptualise the firm in terms of its resources, and that resources differ across firms and are thus heterogeneous in nature. The RBV argues that when firms have resources that are rare or difficult to imitate then sustainable competitive advantage can be gained (Barney, 1991; Conner & Prahalad, 1996). The dynamic capabilities framework therefore acts as an extension of RBV thought by applying this thought to increasingly dynamic

and changing markets (Teece, 1997). The RBV, upon which the dynamic capabilities framework is built, while offering a central and strong platform, is also a platform that has faced its own criticisms (Hoopes et al., 2003). Key in the criticisms of the RBV is the assertion that it is too broad in its nature (Cool, Costa & Dierickx, 2013; Priem & Butler, 2001). This is further driven by the viewpoint of Porter (1991) that the RBV is overly introspective in its approach. In light of these criticisms, attention has been directed towards the extent to which dynamic capabilities offer an extension that builds and improves upon RBV thinking. The cornerstone upon which the dynamic capabilities framework is built, heterogeneity, forms many of the assumptions within dynamic capabilities research and yet this heterogeneity is challenged by Eisenhardt and Martin (2000), who assert that while it is possible for dynamic capabilities to exert commonality this doesn't preclude differential performance.

The changing environment referred to in the work of Teece (1997) and Teece and Pisano (1994) refers to the business ecosystem, thus marking a move away from considering industry dynamics alone, something that has been inherently supported by highly influential strategic frameworks such as Porter's Five Forces Model (Porter, 1980). The environmental context referred to within the dynamic capabilities framework is therefore one that sees the environment as 'the community of organisations, institutions, and individuals that impact the enterprise and the enterprise's customers and suppliers' (Teece & Pisano, 1994, p. 539). This therefore encompasses a wide range of environmental dynamics, which extend well beyond that of industry alone.

Driven by the want to answer what undergirds competitive advantage, the dynamic capabilities framework seeks to understand what is distinctive about a firm. Competencies and capabilities within the firm cannot be readily assembled through markets and are instead the product of the internal organisation. Those competencies and capabilities that are unique and hard to replicate, as suggested in the work of Barney (1991), provide a firm with competitive advantage. Replication of internal practices is inherently difficult and differs from resources that can be replicated in the market. Teece, in his work towards developing the dynamic capabilities framework, sought to advance initial

thinking that the most strategic dimensions of a firm are in fact managerial and organisational processes (Teece, 2007; 2009).

Teece, Pisano and Shuen (1997) note that managers must be able to 'integrate, build, and reconfigure external competencies to address rapidly changing environments' (p.516). The dynamic capabilities framework enhances the RBV of the firm by adding specific thought to the equation. Interest in dynamic capabilities over recent years has been fuelled by the link between dynamic capabilities, valuable competitive advantage and firm performance. However, despite dynamic capabilities being a dominant topic across the strategic management and management literature, it is a concept that has not yet fully crossed into mainstream discussions targeted towards CEOs and managers alike within the firm, as a result of the terminology and meaning not being fully recognised or effectively communicated. To begin these discussions there is a need for researchers in the field to become more concrete in their ideas. One such area that requires further exploration is the relationship between dynamic capabilities and firm performance and the nature of this relationship.

The immense potential of the dynamic capabilities framework to integrate and explore various perspectives, and to provide an understanding of organisational processes is a central driver of this research. However, at present there is a missing link, which impedes the development of this framework, and, this missing link is positioned as an understanding of individuals and thus microfoundations. This research, starting with this literature review, seeks to show how by including individuals within the dynamic capabilities framework, it is possible to unite and integrate a variety of fields; notably strategic management, organisational behaviour and psychology. Moreover, a move towards a study of microfoundations supports a conceptualisation of dynamic capabilities which moves away from their treatment as higher order routines (Collis, 1994). This supports the thinking of Teece (2014: 332) who considers dynamic capabilities to 'reside, in part, with individual managers and the top management team'. This research thus fits in and contributes to existing work exploring the microfoundations of dynamic capabilities and more broadly, routines (Felin et al, 2012; Felin & Foss, 2005; Teece, 2007).

Teece (2014; 348) positions the dynamic capability framework as offering a 'truly fundamental understanding of the origins of firm level heterogeneity and the sources of enterprise-level value creation, capture and growth'. While this research supports this thinking and highlights the importance of the dynamic capabilities framework, it also argues that, for theoretical advancement there is a need to focus more on individuals to develop and build a complete understanding. At present, studies largely focus upon the firm/organisational unit and this stems from traditional interpretations of the resource based view of the firm where the firm is positioned as acting by itself through its assets, capabilities and attributes. This interpretation of the firm however promotes a depersonalisation of actors within the firm where employees are treated as a resource. Instead, organisations should be treated as bundles of people and this aligns to the thinking of Felin and Foss (2005; 43) who note that organisations 'consist of people and exist because of people'.

The move towards a human interpretation of the dynamic capabilities framework largely remains at a theoretical level. One of the earliest attempts to explore this at an empirical level was by Adner and Helfat (2003) who introduced dynamic managerial capabilities. These capabilities allow managers to create and in turn manipulate organisational competencies which are based upon three factors: managerial human capital, managerial social capital and managerial cognition. Empirical evidence supporting managerial cognition was achieved eight years later in the work of Daneels (2011). Later, aligned to the thinking of Teece, Peteraf (2014) classified dynamic managerial capabilities into sensing, seizing and transforming suggesting that each of these was based on a corresponding managerial cognitive capability e.g. attention, reasoning, communication. This work therefore builds on this existing theoretical work by investigating personality as a determinant of behaviour, and its relationship with sensing, seizing and transforming.

Adner and Helfat (2007) acknowledge and reflect upon the relevance of dynamic capabilities to the individual decision maker. An increase in attention

has been directed towards the move towards looking at managers and leaders in the firm. Where dynamic capabilities were once considered to be 'rooted in high performance routines operating inside the firm, embedded in the firm's processes, and conditioned by its history' (Teece & Pisano, 1994: 533). It is now recognised that 'certain dynamic capabilities may be based on the skills and knowledge of one or a few executives rather than on organisational routines' (Teece, 2012: 1395) and that dynamic capabilities 'are partly resident in the leadership team itself' (Teece, 2014: 347). This research thus builds on existing theoretical thought by empirically examining if through the personality of TMT members, dynamic capabilities reside in the leadership team and thus influence the processes of sensing, seizing and transforming.

In 2014, Di Stefano et al brought 'attention back to internal processes, and, more specifically, to the role of individuals in creating, implementing, and renewing dynamic capabilities' (p.322). This attention towards individuals creating, implementing and renewing dynamic capabilities links to the study here of the personality of CEOs/TMTs and how they report sensing, seizing and transforming. It is very much the focus here that individuals matter and have the power to influence wider organisational dynamic capability reporting's. Sensing, seizing and transforming do not start by themselves; they are launched, influenced and conducted by people. They are therefore in top managers and in team leaders thus individuals who are able to sense opportunities, influence decisions, seize opportunities and continually change to move towards a state of transformation. The foundations of dynamic capabilities as such are personal routines and personal activities. If dynamic capabilities reside exclusively within individuals, then individuals use them to manage and change both personal and organisational competences. The dynamic capabilities framework can be therefore considered, as it is in this research, to be a nexus between individual and organisational resources. The conceptual model, presented in figure one, demonstrates the interconnection between individual level personality, the dynamic managerial capabilities of sensing, seizing and transforming within the TMT, and wider organisational practices of learning and performance. It is important in an articulation of the conceptual model to reinforce the idea here that individuals are the primary source of influence. For

example, dynamic managerial capabilities expressed by individuals influence the behaviour of individuals and become embedded within the organisation thus developing organisational level capabilities.

2.1.2 Dynamic Capabilities and Firm Performance

There has been significant debate concerning the effects, outcomes and consequences of dynamic capabilities, particularly regarding their relationship to firm performance. Teece, Pisano and Shuen (1997) argue forcefully for a link between dynamic capabilities and superior competitive advantage. They state that we refer to this ability to achieve new forms of competitive advantage as *dynamic capabilities*. Teece (2007) returned to this idea with a specific focus on the micro-foundations of dynamic capabilities, arguing that dynamic capabilities should be treated as 'the foundation of enterprise level competitive advantage in regimes of rapid (technological) change' (p. 1341). Seeking to draw out dynamic capabilities in more detail, Teece (2007) separated dynamic capabilities into component capabilities, upon which he argued firms needed to focus in order to sustain superior performance in light of dynamic environments.

Adopting a different approach to that of Teece, Eisenhardt and Martin (2000) assert that dynamic capabilities represent best practice within the firm, referring to dynamic capabilities as:

The firm's processes that use resources, specifically the processes to integrate, reconfigure, gain and release resources, to match and even create market change. Dynamic capabilities thus are the organisational and strategic routines by which firms achieve new resource configurations as markets emerge, collide, split, evolve and die (Eisenhardt & Martin, 2000, p. 1107).

Eisenhardt and Martin (2000) argue that dynamic capabilities cannot be a source of competitive advantage and instead that dynamic capabilities represent equifinality, in which a state of competitive advantage could be achieved by

many means, with dynamic capabilities representing a type of best practice. Viewing dynamic capabilities as *processes*, Eisenhardt and Martin (2000) highlighted that dynamic capabilities were important not only in high velocity markets but also in more moderately dynamic markets. This raised the possibility of different dynamic capabilities developing in the context of varying market dynamism.

Teece (2007) countered these claims by responding to Eisenhardt and Martin (2000), arguing that best practices do not constitute dynamic capabilities. However, Zollo and Winter (2002) further cast doubt on the link between dynamic capabilities and performance, arguing that dynamic capabilities reflect the pursuit of effectiveness but do not in themselves constitute performance.

Much of the inconsistency and debate existing within the field is fuelled by the inconsistencies across two of the most significant papers in the field: Eisenhardt and Martin (2000) and Teece et al. (1997) are considered to offer 'not only differing but contradictory views of dynamic capabilities' (Peteraf et al., 2013, p. 1389). Coming from different research traditions, they are approached from different theoretical underpinnings and yet it has been ascertained that Eisenhardt and Martin 'selectively adopt ideas from the Teece side of the divide' and shape these ideas. Teece is thus considered to be the most dominant thinker in this arena.

The uncertainty surrounding what effect dynamic capabilities have on performance is considered, in part, to be driven by the developmental stage that the frameworks of dynamic capabilities are in and the different agreements regarding their properties. As a result, there is a need for meaningful conversation in order to move the field forward. Importantly, attention needs to be directed towards developing the construct to ensure that empirical work is both directive and focused. To date, empirical and conceptual work has been conducted on the link between dynamic capabilities and performance and, again, little consensus has been agreed upon. Dynamic capabilities, for example, are considered by Teece and Pisano (1994) to be 'rooted in high

performance routines' (p.21) and the link between dynamic capabilities and firm performance has been widely promoted (Drnevich & Kriauciunas, 2011; Wu & Lin, 2006; Makkonen, Pohjola, Olkkonen & Koponen, 2014).

In a simulation study by Zott (2003) dynamic capabilities were explored in relation to differential firm performance. Viewing dynamic capabilities as evolutionary in nature, Zott (2003) argued that the relationship between dynamic capabilities and firm performance was inherently complex and far from straightforward. For dynamic capabilities to be linked to performance, Zott argued that there was a need to understand how they could be configured uniquely to achieve the superior performance aligned to competitive advantage. To move towards an understanding of the relationship, Zott promoted the need to explore dynamic capabilities and their link with firm performance from an empirical standing. Zott (2003) cemented the idea that the presence of dynamic capabilities alone is not sufficient for firm performance and that instead dynamic capabilities influence performance through a modification of the resources and routines within the firm. Interestingly, Zott also argued that different resources have 'differentiated performance levels' and thus dynamic capabilities can indirectly result in varying levels of performance (p. 263). This is a finding that, although not dismissing the link between dynamic capabilities and performance, did support how often the relationship empirically shown between dynamic capabilities and firm performance is indirect. This raises the importance of not jumping to conclusions surrounding dynamic capabilities and the level of difference they make within the firm.

Helfat and Peteraf (2009) further contributed to the debate about whether dynamic capabilities result in improved firm performance by reviewing the logic across core dynamic capabilities work by Eisenhardt and Martin (2000) Teece, Pisano and Shuen (1997) and Teece (2007). For example, in the work of Teece, Pisano and Shuen (1997), Teece argues that managerial-level activities allow for new positions to be developed, which, in turn, has implications for firm performance, profits and ultimately competitive advantage. Eisenhardt and Martin (2000) support this conceptually, stating that dynamic capabilities have a direct effect on firm performance, as well as a more indirect influence through

the ability of the firm to reconfigure and transform resources. What these main writers therefore promote is that the processes/activities that support dynamic capabilities are fundamental to the relationship between dynamic capabilities and performance, and thus any relationship with performance cannot be explored without looking at the detail of such and the people/processes within the firm. What is not useful, therefore, is reviewing and studying dynamic capabilities in isolation.

Protoogerou, Caloghirou and Lioukas (2012) support the contention that the relationship between dynamic capabilities and firm performance is indirect in nature. Using empirical data from manufacturing firms, the authors (2012) argue that dynamic capabilities should be treated as 'antecedents to functional competences', and it is the functional competencies of managers within the firm that have a significant effect on performance. When testing dynamic capabilities directly with performance, no relationships of significance were found. The long-term performance of a firm is thus seen to rest within the way in which managers are able to reconfigure and manipulate dynamic capabilities to form new, more innovative forms of competitive advantage. The authors therefore position dynamic capabilities as tools that can be used.

Interestingly, despite discussions being largely conceptual in nature, the general consensus is that dynamic capabilities are needed within the firm as a result of the belief that in some way they facilitate a more superior competitive position and thus competitive advantage. Dynamic capabilities are articulated and aligned with competitive advantage, which has created a powerful link that has not yet been subject to detailed empirical rigour. To move the field forward, attention has to be directed towards aligning conceptual thought with concrete empirical evidence, which requires the development of measurement tools. Contributing to a specific and fundamental debate within the field, the various forms that dynamic capabilities can take and the various functions in which they are involved contribute to the complexity of unravelling the nature of this relationship.

2.1.3 Macro-Dynamic Capabilities: Adaptive, Absorptive and Innovative Capability.

Dynamic capabilities can be conceptualised on two levels: the macro and the micro level. The macro perspective of dynamic capabilities sees dynamic capabilities as firm-level processes and thus looks at the organisational routines of dynamic capabilities. Dynamic capabilities at the macro level are associated with *reconfiguring market* competencies (Rindova & Taylor, 2002) and are higher order in nature.

It is the application of dynamic capabilities that is fundamental to competitive success. Their presence alone is not sufficient. Eisenhardt and Martin (2000) state that dynamic capabilities can only be a source of competitive advantage if they are applied 'sooner, more astutely, and more fortuitously' than by other competitors. This is considered by Wang and Ahmed (2007) to be at the heart of dynamic capabilities and thus differs to Eisenhardt and Martin's (2000) own view of dynamic capabilities, that they can become irrelevant over time. Wang and Ahmed (2007) argue instead that it is fundamental to focus upon their superior application over other firms in order to underpin a firm's competitive position. Path-dependent in nature, dynamic capabilities are shaped by the decisions a firm has made and the assets it holds (Zollo & Winter, 2002). Zollo and Winter (2002) argue that learning is a mechanism that helps to develop dynamic capabilities within the firm. They argue that dynamic capabilities are shaped by learning and, as such, there is a need to adopt a focused, deliberate approach to learning. The thinking within the work of Zollo and Winter (2002), while highlighting the importance of learning, fails to account for the argument that learning may in itself be a dynamic capability. If firms adopt learning as a deliberate action then how is this different to the decision to reconfigure resources and capabilities within the firm? The discussion presented by Zollo and Winter (2002) therefore has strengths in its description of actual activities and specifics but lacks the presentation of the larger issues surrounding the treatment of learning.

Across empirical findings within the field, three main firm-level component factors of dynamic capabilities are widely cited: adaptive, absorptive and innovative capability. These three components work together to explain how firms link internal workings with external marketplace based competitive advantage. These three capabilities are thus capabilities that exist at firm level and enable the disaggregation of dynamic capabilities. There is, however, room to question the appropriateness of constraining dynamic capabilities in this fashion, which is not fuelled by any empirical studies capturing what these capabilities might resemble within the firm.

Adaptive capability

Adaptive capability is defined as a firm's ability to identify and capitalise on emerging market opportunities (Miles, Snow, Meyer & Coleman, 1978; Winter, 2003). The adaptive capability of the firm therefore refers to the effective search for strategies. For example, Rindova and Kotha (2001) refer to how the firm Yahoo adapts through 'continuous morphing', where Rindova and Kotha (2001) state that 'firms undergo comprehensive, continuous changes in products, services, resources, capabilities and modes of organising' (p. 1276). Dynamic capabilities are, in this essence, reflected through a firm's capability to adapt. This is highlighted in the work of Alvarez and Merino (2003) as being fundamental and critical to a firm's evolution and survival. At management level, adaptive capability is measured in the work of Gibson and Birkinshaw (2004) by evaluating whether management systems within the firm encouraged people to challenge existing ideas and norms within the firm. The more management encouraged people essentially to speak out, the higher the level of adaptive capability within the firm. This type of research thus began to merge macro thinking with micro thinking within the firm. Adaptive capability has various applications and sits across a variety of functions within the firm. The role of adaptation is also not unique to the study of dynamic capabilities, with academics having placed great importance on strategic flexibility and adaptation for many years prior to the emergence of dynamic capabilities as a separate area of focus.

Absorptive capability

Absorptive capability is defined by Cohen and Levinthal (1990) as 'the ability of a firm to recognise the value of new, external information, assimilate it, and apply it to commercial ends...the ability to evaluate and utilise outside knowledge is largely a function of the level of prior knowledge' (p. 128). Across the literature, those firms with higher absorptive capability are seen to demonstrate a superior ability of learning. A number of conceptual works thus highlight the link between high absorptive capabilities and the exhibiting of dynamic capabilities within the firm (George, 2005; Salvato, 2003). To date, while the absorptive capability of firms is believed to be fundamental to success, it is something that has not been empirically explored, which relates to the challenge of being able to capture a capability often considered to be deeply rooted and somewhat inherently hidden within the firm.

Innovative capability

Innovative capability works with adaptive and absorptive capability. The innovative capability of the firm refers to its ability to develop new products in an innovative manner. Innovative behaviours and processes, as seen in the work of Wang and Ahmed (2004), ultimately support the firm's ability to renew and reconfigure practices and processes within the firm.

While appreciating each as distinct capabilities, Wang and Ahmed (2004) support that the three capabilities are inherently linked and, in turn, support one another. An understanding of these three capabilities is therefore used to understand dynamic capabilities in further detail. The usefulness of placing dynamic capabilities in disaggregated groups allows for dynamic capabilities to be broken down and for discussions to take place related to each of the capabilities discussed. Challenges, however, relate to the overlapping and the relationships that exist between them, which can create blurred lines that are difficult to separate empirically. To advance understanding in the field, there is a

need to unravel the details of each of the capabilities presented and what it truly means to have something like adaptive capability. How can a firm utilise it and how can they foster it within the firm? To do this, attention must be directed towards its empirical measurement, achieved through greater conceptual discussions and clearer frameworks.

2.1.4 Learning as a Dynamic Capability

At the macro level, dynamic capabilities are positioned as evolutionary, higher-order capabilities. To discuss what actually constitutes a dynamic capability, Helfat and Peteraf (2003) argue that a capability needs to change a resource base, be embedded within the firm and be repeatable. Learning is something across the dynamic capabilities framework that is considered to be important with specific reference to the collective nature of learning, which has been positioned both as an antecedent of dynamic capabilities and as a dynamic capability itself throughout the field. Throughout the dynamic capabilities literature, learning is regularly referred to, thus highlighting its importance.

The thinking surrounding dynamic capabilities at the organisational level aligns with one particular aspect of organisational development: learning. On the one hand, learning is viewed as an antecedent of dynamic capabilities, and this is illustrated, for instance, by Zollo and Winter (2002), who explain that learning guides the evolution of dynamic capabilities. It is considered to do so by creating a platform from which dynamic capabilities can be built within the firm. Zott (2003) supports this position by viewing dynamic capabilities as a core ingredient of the system of evolutionary learning within the firm. Learning is considered to be central to the dynamic capabilities framework, with dynamic capabilities being the product of both past experiences and future learning within the firm.

On the other hand, underpinned by the evolutionary nature of dynamic capabilities, learning can also be considered a dynamic capability rather than, as others position it, an antecedent. Teece et al. (1997) state that learning 'is a

process by which repetition and experimentation enable tasks to be performed better and quicker' (p.520). This position supports that learning is, in itself, a dynamic capability as a result of its focus on renewal and reconfiguration for organisational success. Referring back to the definition of what constitutes a dynamic capability by Helfat and Peteraf (2003), learning can be viewed as a dynamic capability, as it facilitates the change of a resource base and is both embedded within the firm and repeatable in its practice.

As presented in the conceptual model in Chapter One, this research measures six individual aspects of organisational learning to capture the detail associated with learning. This marks a move away from those studies where learning is treated in a general sense with little interpretation of what learning means. The first of the measures of learning is commitment to learning within the firm (Calantone, Cavusgil & Zhao, 2002). Commitment to learning is defined as 'the degree to which an organisation values and promotes learning' (Sinkula, Baker, Noordewier, 1997, p. 305). The more a firm values learning and is committed to learning within the firm, the more likely it is that learning will occur. The organisation needs to demonstrate a commitment to learning to encourage employees to pursue new learning within their job role (Tsai, Yen, Huang & Huang, 2007). Commitment to learning has been empirically explored in a number of key areas, including job satisfaction (Pool & Pool, 2007). The more employees feel the firm is committed to learning, the more committed and motivated they feel (Egan, Yang & Bartlett, 2004; Meyer, Becker & Vandenberghe, 2004).

Linking commitment to learning with the study of dynamic capabilities, Easterby-Smith and Preito (2008) highlight that an organisational focus to commitment to learning harnesses the commitment employees feel to developing as individuals. This, in turn, naturally results in an evolution of the ability of individuals within the firm to learn from exploration and exploitation opportunities. This commitment to learning is therefore needed to create a learning culture that is capable of fostering and nurturing the cognitive capabilities of individuals (Jo & Joo, 2011).

The second measure of learning refers to the need to capture learning related to the systems perspective of the organisation. This measure of learning refers to the extent to which learning within the firm is system-wise and not contained within certain parts. This supports the view of looking at the firm as an entire system (Jackson, 2003; Maani & Cavana, 2000). The systems perspective entails the firm's ability to bring organisational members together with a clear vision of learning within the firm (Stata & Almond, 1989). The need to adopt a systems perspective to learning within the firm is driven by the need to go beyond individual learning and ensure that learning takes on a collective nature within the firm (Jerez-Gomez Cespedes, Lorente & Valle Cabrera, 2005; McGill, Slocum & Lei, 1992).

The third measure of learning, openness to learning, is used to understand how open the organisation is to learning and how open employees feel the organisation is. Openness to learning refers to the extent to which an organisation is open to new ideas and knowledge within the firm (Jerez-Gomez, Cespedes-Lorente & Valle Cabrera, 2005). This openness to new ideas within the firm favours an activity such as sensing where different perspectives are collected in order to improve the firm's knowledge. A firm that is open to learning is one that promotes a culture of creativity and innovation, which is something that inherently relates to dynamic capabilities (Lawson & Samson, 2001). It does so as it encourages routines where capabilities are constantly renewed and rethought to deal with changes in the wider, macro business environment (Teece, 2009).

The fourth measure of learning, central to an exploration of learning within the firm, is knowledge transfer and integration. Referring to two separate processes, knowledge transfer and integration are considered to occur in a simultaneous manner. This approach to learning is considered to be inherently related to a firm's absorptive capability and thus dynamic capabilities. The transfer of knowledge reflects an individual transfer of knowledge that may occur as a result of formal or informal channels of communication within the

firm. Integration, on the other hand, is what takes this knowledge and integrates it into the wider cultural practices of the firm. Knowledge acquired in this vein can then be applied to different situations, allowing the firm to develop an ability to innovate and renew constantly (Levitt & March, 1988; Simon, 1991).

The fifth measure of learning refers to learning that is specifically related to strategic alliances/acquisitions. As previously discussed, the context in which this research is placed is one that views only those firms that have undergone a strategic alliance or acquisition in recent years. This is a result of this being an important context that promotes the enactment and need for dynamic capabilities. Learning linked to strategic alliances refers to capturing what has been learnt from the strategic alliance and whether, as a result of such an alliance, learning has improved. This strongly relates to a large body of research arguing that learning improves as a result of strategic alliances/acquisitions (Hamel, 1991; Howard, Steensma, Lyles & Dhanaraj, 2015). Learning linked to strategic alliances/acquisitions is inherently related to the final measure of learning captured in this research: intra-organisational knowledge sharing.

Intra-organisational knowledge sharing is defined as 'the collective beliefs or behavioural routines related to the spread of learning among different units within an organisation' (Calantone, Cavusgil & Zhao, 2002, p. 520). This is an important aspect of learning, which is considered to keep knowledge alive throughout the organisation. It does so by supporting the sharing of knowledge across departments, which draws on an accumulation of individual learning. As presented in the work of Moorman and Miner (1998), this is an important aspect of learning, as without this, even with a shared vision and commitment, learning would be limited. Moorman and Miner (1998) also present that learning only really occurs when a system exists to share learning and thus knowledge within the firm. Related back to the study of dynamic capabilities, intra-organisational knowledge sharing relates strongly to all three of the dynamic capabilities activities, where sensing, seizing and transforming all require some form of knowledge sharing. This is highlighted by Wang and Wang (2012), who argue that knowledge-sharing behaviours contribute to the generation of capabilities

within the firm. This is more specifically related to dynamic capabilities in the work of Protoyerou, Caloghirou and Lioukas (2012).

In sum, despite the concept of dynamic capabilities having been in existence since the mid-1990s, discussions are still taking place regarding what constitutes a dynamic capability, as evidenced here with a discussion surrounding whether learning is an antecedent of a dynamic capability or a dynamic capability itself. While these discussions are necessary, they also result in challenges due to different positions emerging as opposed to a merging of views. Moving towards a more specific understanding of dynamic capabilities, the study of the micro-foundations of dynamic capabilities has emerged in response to the call for greater specificity and focus.

2.1.5 Micro-Foundations of Dynamic Capabilities

While progress has been made towards identifying and understanding the nature of routines and capabilities, the underlying micro-foundations of such have received less adequate attention, which herein acts as a motive for this study. The microfoundations approach as presented by Felin et al (2012) 'identifies a set of collective phenomena in need of explanation, specifically the origins, creation and development, reproduction, and management of collective constructs such as routines and capabilities. It also offers explanation of these collective phenomena requires consideration of lower level entities, such as individuals or processes in organisations, and their interactions' (p.2). This individual focus promotes detail and draws on the traditional notion of microfoundations which illustrates a process of reduction.

As identified in the work of Felin, Foss, Heimeriks and Madsen (2012) 'numerous questions remain regarding the micro-level origins of routines and capabilities' (p.1352). A micro-foundations perspective highlights individuals to understand and in turn illustrate collective phenomena that through focus and study need explanation. Specifically, the way in which capabilities and routines are created and developed within an organisational context. By focusing upon lower level entities such as individual behaviour and personality within an organisation,

researchers give consideration to individuals and in doing so seek to unravel the nature and interactions present within a collective phenomenon. Far from implying that collective level constructs cannot be part of the explanation, the micro-foundational approach is strongly driven by a theoretical and empirical unpacking of routines and capabilities to drive understanding as to what triggers or results in differences in behaviour and performance within an organisational setting (e.g. Argote & Ren, 2012; Helfat & Peteraf, 2015). For example, in the work of Schneckenberg, Truong and Mazloomi (2015) innovative capabilities were shown to be the result of interdependencies which exist between microfoundations. While this interplay is complex and driven by knowledge sharing and learning processes, the authors argue that individual level managerial processes and systems enable firms to operate efficiently in dynamic and ever changing business environments. The clarification gained from the micro foundational approach allows for researchers to draw conclusion surrounding the heterogeneity of different firm performance. Gavetti (2005) refers to this as allowing for a more 'refined' perspective which enhances understanding of organisations.

The importance of studying at the micro level stems from an assumption that the early stages of development of a construct begin at an aggregated macro level i.e. Teece and Pisano (1994) where it is assumed that micro-level phenomena have a uniform effect on aggregate level phenomena. As the study of a construct develops, as seen in the evolution of the study of dynamic capabilities, assumptions about micro-level uniformity begin to change and this paves the way for the micro foundations of a given concept to be explored cumulating in Teece's (2007) paper on microfoundations and later managerial cognition and individual behaviour amongst some of the microfoundations being considered and discussed (Helfat & Peteraf, 2015; Hodgkinson & Healey, 2011). The link between individuals and micro level phenomena is one which is present stemming from a focus on individuals to explain wider organisational phenomena. McKelvey (1998) argues for example that micro-level phenomena 'are often more idiosyncratic in nature than not'. The vast heterogeneity in the individual level thus needs to be explored to, in turn contribute to the theoretical underpinning of a concept by seeking to understand how variance at

the micro level contributes to changes at the firm level. As a form of reduction, Elster (1989, p. 74) argues that 'reduction is at the heart of progress in science'. The micro-foundation approach thus allows for the fundamental, more nested components of phenomena to be explored to facilitate understanding at the collective level.

The study of micro foundations implies that the micro level 'holds explanatory primacy' (Foss, 2010, p. 1413). What is however important to understand is that an understanding of micro-foundations does not deny that higher-level phenomena is also important and may influence lower level phenomena. Micro-foundations research, while promoting the value of studying the individual does not imply that the macro constructs have no place in strategy research. As evidenced in this study, the micro-foundations approach and macro interpretation complement and extend each other. What this research argues is that a firm level construct such as organisational learning, dynamic capabilities or firm performance are carried and embedded by individuals and as such this naturally points towards empirical study examining the actions/individual differences of those within the firm.

Teece (2007) defines the micro-foundations of dynamic capabilities as 'distinct skills, processes, procedures, organisational structures, decision rules and disciplines' (p. 1319). It is this detailed, micro-foundation level that is increasingly positioned as forming the basis for the very understanding of how dynamic capabilities are built and enacted and, in particular, the role that individual differences play.

A level of scepticism often exists when discussing dynamic capabilities. While strong, conceptual arguments exist to support dynamic capabilities as being central to competitive advantage, others doubt that such capabilities actually even exist in the firm. As a field, some have criticised dynamic capabilities for their 'black box', intangible nature. This has resulted in some believing that dynamic capabilities are 'born and not made' and therefore not related to managerial processes. In light of this criticism, great attention has been directed

towards establishing what is meant by the organisational and managerial processes of dynamic capabilities to improve clarity. As presented in the work of Winter (2003), in order to understand dynamic capabilities there is a need to move away from ambiguous discussions towards the specifics upon which the dynamic capabilities frameworks were originally built. A lack of specificity within the field gained since its emergence in 1997 is considered to be an inherent weakness threatening the future of the field.

In recent years, a new stream of research has been seen to emerge in the field of strategic management. Exploring and analysing strategic management topics from an individual perspective, the micro-foundations of strategic management have emerged as an important line of enquiry (Molina-Azorín, 2014; Teece, 2007). By looking at the foundations of strategic concepts through people within the organisation, micro-understandings have contributed to a greater overall understanding of macro-level phenomena. Across the dynamic capabilities literature, a number of researchers have begun to get to grips with the nature of the micro-foundations of dynamic capabilities, for example, Abell, Felin and Foss (2007), Augier and Teece (2008), Clarysse and Bruneel (2014), Helfat and Petaraf (2015), Hodgkinson and Healey (2011) and Teece (2007).

When dynamic capabilities were first introduced as a concept, they were described in terms of a firm's ability and were therefore something that the firm possessed (Teece et al., 1997). Since Teece's publication, the field has evolved to focus on the nature of this ability, which has resulted in the emerging study of the micro-foundations of dynamic capabilities. This is captured in the work of Eisenhardt and Martin (2000) and Winter (2003), where they are referred to as 'pattern activity' and 'embedded processes' (p.1106). Difficulty and challenges, however, result in the study of micro-foundations of dynamic capabilities as a result of the intangible, often hidden nature concealing a concrete, objective measure.

The micro-foundations of dynamic capabilities thus explore the heterogeneity of individuals within the firm, expanding to the psychological and behavioural

nature of dynamic capabilities. Linked to the idea that dynamic capabilities result in routines and patterns within the firm that are difficult to imitate, Winter (2000) refers to the idea that the extent to which a capability performs its original function is 'a matter of degree' (p. 981). This, in turn, supports the fact that capabilities develop in part through the practice and experience of individuals and groups within the firm.

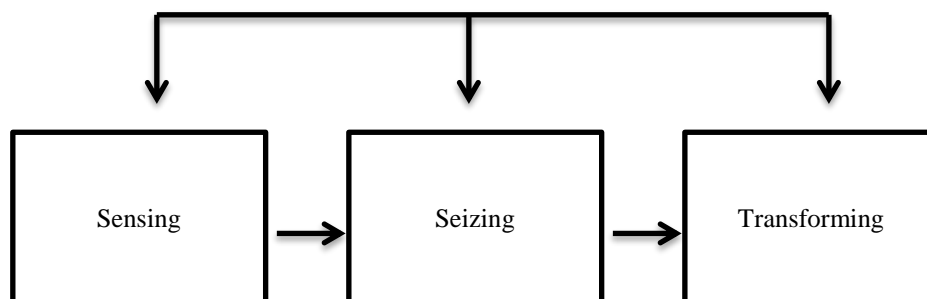
The founding of capabilities in the firm is considered to be the product of a number of individuals within the firm, who it is considered group together with the specific objective of forming a capability. Humans bring their own configuration of personality, cognition and knowledge, which works with the social interactions of the group in which they are present; it is the unique combination of individual-level cognition and social team conditions that create dynamic capabilities. This, in turn, as supported by Helfat and Peteraf (2003), suggests that different dynamic capabilities may be the result of differences in the managers who enact them. If this is the case then there is a need to understand how such differences result in the different enactments of dynamic capabilities.

To explain differences at the managerial level, Adner and Helfat (2003) introduced the concept of 'dynamic managerial capabilities'. These are capabilities 'with which managers build, integrate and reconfigure organisational resources and competencies' (p. 1012). The changes and influence a manager has with regards to dynamic capabilities are thus seen as the product of that individual's human capital, social capital and cognition. Despite Adner and Helfat's (2003) research demonstrating that differences in a manager's decisions contribute to differences in firm performance, the suggestion that it is differences in the individual make-up of that person that result in differences was only conceptually explored. In order to understand the nature and influence of differences in more detail, Adner and Helfat (2003) argued that there was a need to explore this empirically to provide clarity. Evidence is therefore needed to show how individual differences in management result in the different enactments of dynamic capabilities. Challenges, however, are fuelled by the lack of measurement tools in the dynamic capabilities arena and thus an inability to

measure individual differences and the relationships they have with dynamic capabilities.

Building on the idea that differences exist within individuals and that these differences are important, Teece (2007) outlined three dynamic managerial capabilities, arguing that heterogeneity here creates a basis for differential, competitive advantage. Drawing on the identification of adaptive, absorptive and innovative capability at firm level [see Section 2.1.3], three activities can be highlighted as underpinning these wider, organisational capabilities. In this capacity, dynamic capabilities can be broken down into three activities: 1) to sense opportunities – *sensing*; 2) to seize identified opportunities – *seizing*; and 3) to maintain competitiveness through the transformation of ordinary capabilities – *transforming*.

Figure 2: Intellectual architecture of dynamic capabilities



Source: Teece (2007, p. 49)

In recent years, notably since Teece's (2007) framework exploring the micro-foundations of dynamic capabilities, an understanding of dynamic capabilities from an individual, psychological point of view has emerged. The ability to undertake the three activities of sensing, seizing and transforming are not uniformly distributed across individuals and, as a result, there is a need to understand how the building of dynamic capacities is driven by individuals within the firm. At present, the micro-foundations literature appreciates that activities such as seizing depend partly on capabilities and partly on user needs.

It is therefore appreciated and conceptually explored that some individuals within a firm may have the necessary cognitive and creative skills required to carry out the activities of sensing, seizing and transforming. It is, however, noted by Teece (2007) that it is important that these activities do not simply lie with a handful of individuals. Instead, Teece (2007) refers to the desirable approach as one in which it is possible to embed and thus promote these activities throughout the firm. To be able to do this, there is a need to draw the relationships that exist between individual differences and dynamic capabilities at the micro level to use individual differences as a predictor.

Pavlou and El Sawy (2011) sought to move towards a platform of understanding the elusive black box of dynamic capabilities. In order for managers to understand dynamic capabilities there is a need to focus upon measurement. Pavlou and El Sawy (2011) propose a measurable model and do so in order to move away from the conceptual discussions dominating the field. Focused upon firms undertaking new product development, Pavlou and El Sawy (2011) argue that new product development is underpinned by process efficiency and product effectiveness, both of which are facilitated by operational capabilities. A core strength in the paper lies in the author's separation of dynamic capabilities from operational capabilities with operational capabilities aligning to the individual, managerial level. The authors proposed model also places emphasis on environmental turbulence and the measure of specific performance related to new product development. Pavlou and El Sawy (2011) showed that dynamic capabilities have a significant effect on operational capabilities and this in turn supports performance. Strength in the paper lies in its focus on the operationalisation of dynamic capabilities and environmental turbulence. Environmental turbulence measured using market and technological dynamism is used to show that turbulence does have an impact. While the Pavlou and El Sawy (2011) paper marks an important move towards the empirical measurement of dynamic capabilities it chose to not focus upon those activities identified by Teece as fundamental: sensing, seizing and transforming. While implied implicitly in the work of Pavlou and El Sawy (2011) through operational capabilities, Pavlou and El Sawy (2011) do not isolate these activities and thus this research extends their thinking and their model to include a measurement

of sensing, seizing and transforming to further create an alignment between empirical and conceptual work and communication with managers.

Sensing, seizing and transforming are the activities that underpin the ability for dynamic capabilities to be deployed (Eisenhardt & Martin, 2000). Sensing, seizing and transforming thus support the ability of the firm to develop the absorptive, adaptive and innovative capabilities discussed above (Sections 2.1.2.1–2.1.2.3). The three activities are often presented in a sequential manner but, as noted by Pavlou and El Sawy (2011), it is possible also to view them in terms of the reciprocal relationships that exist between them. Pavlou and El Sawy (2011) further argue that in order to move away from 'the elusive black box of dynamic capabilities', there is a need to focus on sensing, seizing and transforming in detail to move towards an understanding of how dynamic capabilities might actually be enacted by management. Teece (2012) notes how, while sensing, seizing and transforming are each supported by organisational processes, they are also supported by the entrepreneurial and leadership capabilities of the TMT. It is therefore within the TMT where there is a need to study each of the capabilities discussed below.

Sensing capability

Sensing, seizing and transforming are often positioned as a basis for the explanation of heterogeneity in firm performance e.g. Teece et al (1997). For example, Teece (2007, p. 1335) argues that through sensing opportunities, dynamic capabilities provide the organisation with a new set of decision options, which have the potential to increase firm performance'.

Sensing is defined by Pavlou and El Sawy (2011, p. 243) 'as the ability to spot, interpret, and pursue opportunities in the environment'. The process of sensing requires searching and exploring with both taking place with an appreciation of both the micro and macro environment. Reflecting upon the psychological foundations of sensing, as presented in the work of Hodgkinson and Healey

(2011) sensing is a shaping process which has a creative element. Recognising and scanning for opportunities, at the micro level is dependent upon an individual's capabilities and, as theoretically positioned in this study, their personality.

Sensing as a process can be thought of as being supported by three routines. The first routine is the generation of marketing intelligence (Galunic & Rodan, 1998). This refers to the need for managers within the firm to generate the intelligence needed to sense opportunities. This links to the idea of synthesizing information to form expert judgements as depicted in the work of Hodgkinson and Healey (2011). Sensing as a process is therefore inherently linked to the idea of being open to new ideas and the action of knowledge sharing. The second routine, inherent to an understanding of sensing is the dissemination of market intelligence (Kogut & Zander, 1996). It is not sufficient enough to simply generate intelligence, but instead individuals must be able to disseminate and interpret information within a context which is applicable to them. This, in turn, links to the third routine of responding and taking action to market intelligence. These three routines linked to sensing can be more broadly linked to the dynamic capabilities literature. For example, Day (1994) refers to the need to identify market opportunities, and Teece (2007) refers to the use of market intelligence to respond to customer needs and therefore create a stronger alignment between customer needs and the wider strategic actions of the firm.

At an individual level, sensing requires individuals to sense, feel and gain an impression of the opportunities that exist within the business environment. This is depicted by Hodgkinson and Healey (2011) as the capacity of individuals 'to recognise sense and shape developments' (p. 1502). Sensing developments is likely to require an individual or individuals to gain information from a variety of sources of look internally for opportunities and room for growth and/or development. It is possible to relate this to an innate desire to see what is out there; sensing moves away from static orientations and promotes the need for individuals within the firm who want to sense the next opportunity and move towards this. Thus, on the one hand while it is important to identify the process of sensing on the other, it is also important to be able to move towards an

understanding of the frequency of which these processes are implemented within an organisation. This frequency is required to move towards these processes becoming somewhat habitual/routine.

Seizing capability

The seizing of an identified opportunity involves the evaluation of existing capabilities in order to make investments likely to support development (Teece, 2007). Seizing can be interpreted as an innovative, creative process as it requires a need to move away from a way of decision making which is somewhat disciplined and sophisticated underpinned by rational thought e.g. Kahneman and Tversky (1979) where the mechanisms for rational decision-making are discussed. Instead, influenced by both emotional judgment and the risk-seeking propensity of an individual, seizing is a process which highlights the need to study at the important micro level and thus the at times, non-rational behaviour of individuals.

Micro-foundations can be embedded in the way in which people behave within a firm. Seizing refers to the need for resources to be mobilised to address an opportunity that has been sensed. Seizing, therefore, is inherently linked to the capturing of value where superior advantage is supported by the ability of the TMT to seize those opportunities that are most valuable to the firm (Wilden, Gudergan, Nielsen & Lings, 2013). As a process, seizing refers to the readiness of individual/individuals to take action and seize the opportunities sensed. Often resulting in an organisation adopting a new direction, the frequency upon which seizing takes place is important as it infers an organisation which is dynamic in nature. Within the present study, the frequency of seizing can be interpreted as a proxy of the statements used within the measurement tool.

Helfat and Peteraf (2009) and Teece (2007) view and discuss seizing as where an investment takes place. Seizing therefore reflecting an investment in a

sensed opportunity which ultimately is undertaken to lead to new paths for the organisation thus supporting dynamism.

At the individual level, seizing is the grasping of an opportunity and the extent to which individual/individuals are able to proceed with a presented opportunity and seize what it has to offer. Here, seizing can be intricately linked to a number of micro foundations including an individual's cognitive capabilities (Hodgkinson & Healey, 2011; Helfat & Martin, 2014), emotional capabilities (Hodgkinson & Healey, 2011) and as positioned in this research to the personality of an individual. For example, seizing/investing in an opportunity requires a level of risk taking which will differ dependent upon the type of opportunity being seized. An individual high in conscientiousness is likely to be someone who will have a lower natural desire to take risks (e.g. Nicholson, Soane, Fenton-O'Creevy & Willman, 2005) and thus likely to have lower reported levels of seizing. Further, a TMT high in reported seizing would be theoretically expected to be a team who regularly discuss options and weigh up risks to move forward and take action. This theoretically could be linked to the openness of experience trait of those within the team e.g. Kruglanski and Webster (1996).

What is fundamentally important for an understanding of seizing is that individuals do not always simply sense information but instead take this further to make an investment in an opportunity. Increasing seizing in this vein pushes the firm towards a more dynamic state.

Transforming capability

Transforming, also known as reconfiguration is regularly positioned as top management ability to 'coordinate and execute strategic renewal and corporate change' (Hodgkinson & Healey, 2011, p. 1502). This strategic renewal at this level places transforming at the heart of the dynamic capabilities framework and thus underpins the ability to gain and sustain a superior competitive position

and thus competitive advantage. The continued renewal of resources within the firm is what allows a firm to draw on a dynamic interplay between the micro and macro environment. However, as argued by Teece (2012) this is a process which is 'inherently difficult to routinize' due to its continual state of fluidity/adaptation.

Aligned to the performance literature, transforming is strongly linked to innovation where the existing resource base within a firm is continually questioned in order to move towards the actions of renewal and adaptation (Teece, 2007; Lewin, Massini & Peeters, 2011). Perhaps harder to conceptualise at the individual level, transforming requires individuals who have the ability to question the norm within the firm. A TMT for example, high in transforming would be expected to focus upon the development of new resources and reconfigure existing resources to support the strategic goals of the firm. Underpinned by evolution and renewal, transforming requires individuals who have the curiosity to improve and the drive to make changes that might not always be easy.

To conceptualise what we can see in organisations there is a need to understand how to unravel and measure sensing, seizing and transforming. A measurement tool is required to move away from the purely conceptual nature of these categories. Empirical research is needed to understand the actual usefulness of these teams and their translation within the firm.

Recognising the importance of the micro-foundations of dynamic capabilities to explore more macro phenomena, there is a need to further understand individual differences. While individual differences are increasingly shown to be important and the basis of the micro-foundations of dynamic capabilities, to the researcher's knowledge no studies have explored dynamic capabilities and the role of one prominent individual difference: personality. Here, in order to explore the micro-foundations of sensing, seizing and transforming, it is argued that there is a need to understand the link between the cognitive capability of an individual to carry out an activity and the role personality may play. The

relationship between personality and cognition is thus subsequently explored as an important future basis for research. Attention is now directed to the concept of personality, cognition and how potential links can be conceptualised between the personality of TMT members and the enactment of dynamic capabilities. Table 2 presents a selection of the key findings from across the micro-foundations literature.

Table 2: Examples of studies exploring the micro-foundations of dynamic capabilities

Author(s) by year	Key Findings/Discussion
Teece (2007)	Proposed a conceptual framework to advance discussions of dynamic capabilities to promote the need to study them from their micro-foundations to understand the foundations of competitive success.
Abell, Felin and Foss (2007)	<p>Extended thinking by arguing two points:</p> <ul style="list-style-type: none"> ▪ Collectivist explanation of the importance of not isolating macro-level dynamic capabilities. Dynamic capabilities best understood at micro level. ▪ Conceptual model highlighting the incomplete nature of macro-dynamic capabilities exemplifying the need to build upon micro-

	foundations.
Hodgkinson and Healey (2011)	<p>Based on Teece's (2007) framework, Hodgkinson and Healey identify the capabilities of sensing, seizing and transforming and the cognitive and emotional capacity of individuals and groups within the firm. The psychological micro-foundations of dynamic capabilities are explored and aligned to social cognitive neuroscience.</p> <ul style="list-style-type: none"> ▪ Argues the need to move away from 'cold cognition logic'.
Gärtner (2011)	<ul style="list-style-type: none"> ▪ Introduces mindfulness as a micro-foundation of dynamic capabilities.
Pavlou and El Sawy (2011)	<ul style="list-style-type: none"> ▪ Proposed a measurable model of dynamic capabilities focused upon both micro and macro levels. ▪ Focused upon New Product Development and 180 firms.
Helfat and Peteraf (2015)	<ul style="list-style-type: none"> ▪ Introduce the concept of managerial cognitive capabilities. ▪ Identification of specific cognitive capabilities. ▪ Heterogeneity supported, which is argued to contribute to differentiation

	performance.
Von den Driesch et al.,(2015)	<ul style="list-style-type: none"> ▪ Explore the micro-foundations of CEO experience, demographics and personality. ▪ Sample of 200+ CEOs with one member from the TMT used to confirm findings.

Challenges of Micro-foundation Research

The challenges of micro-foundation research are discussed in a special issue of *Strategic Management Journal* where Foss and Pedersen (2014) introduce micro-foundations in strategy research. Reflecting upon the papers published within the special issue, Foss and Pedersen (2014) conclude that the challenges to the micro-foundations research agenda is largely empirical as opposed to theoretical in nature. This is highlighted by Floyd and Spletter (2011) who note that 'empirical work in the micro-foundations area is still relatively scarce' (p. 15). The reason for a dominance of theoretical work over empirical work on micro-foundations is the methodological challenges which exist. However, as recognised by Foss and Pedersen (2014) 'strategic management is fundamentally an empirical discipline, and new research may not pass muster if they are not productive of new empirically corroborated insights'. This study therefore has sought to build on the existing theoretical foundations of micro level research and aims to provide an empirical lens to move away from dominant conceptual thought as highlighted by Teece (2012).

One of the inherent challenges of micro-foundation research is the requirement for data sampling on at least two levels which is often positioned as being both costly and time consuming (Blettner, Chaddad & Bettis, 2012). Second, when dealing with a black box concept such as dynamic capabilities, challenges arise with regards to the measurement of a concept at the micro-foundation level. This often requires the development of new measurement tools which may lack the rigour of long standing tools within the field. The empirical challenges of micro-foundation research are further heightened when analysis strategies are discussed e.g. a reliance on quantitative methodologies and single level studies, this type of approach limits the extent to which interactions and complexity can be captured (Felin, Foss & Ployhart, 2015). Subsequently, an understanding of micro-foundations and a move towards a more empirical basis is likely to trigger a greater focus on new methodologies capable of capturing behaviours and interactions. This in turn has the power to influence the methodological focus across the field of strategy something which Foss and Pedersen (2014) view as being an 'exciting challenge'.

2.2 Personality

Since the 1980s, the interest in personality has steadily grown (Oreg, 2006; Organ & Lingl, 1995). However, despite this steady appreciation of personality across a number of fields, including organisational behaviour, organisational psychology and human resource management, strategic management as a field has been slow to appreciate the value of personality to strategic outcomes within the firm.

In 1986 Miller and Toulouse empirically examined 97 firms in order to determine the relationship between CEO personality and corporate strategy. This was one of the first studies to present the link between the personality of an individual and corporate strategy. With significant relationships found, Miller and Toulouse (1984) highlighted that the relationship between personality and organisational characteristics was particularly prominent in small firms and importantly influenced by dynamism in the business environment. In support of this, some years later, in 2003, McCarthy argued that 'strategy is personality driven' (p. 327). Reviewing the nature of entrepreneurial firms, McCarthy (2003) explored how the personality of the entrepreneur influenced the direction in which that firm would go. Both studies, not approached from a strategic management perspective, supported the idea that personality was an important consideration.

To date, personality has been linked to a number of core areas that have shed light on the dynamics of organisational life, including: job satisfaction (Judge, Bono & Locke, 2000; Judge, Heller & Mount, 2002), organisational citizenship behaviours (Bettencourt, Gwinner & Meuter, 2001; Neuman & Kickul, 1998) and team effectiveness (Barrick, Stewart, Neubert & Mount, 1998; Morgeson, Reider & Campion, 2005; Peeters, Tuijl, Rutte & Reymen, 2006). However, it was only recently that the field of strategic management began to appreciate the role personality might play in explaining firm-level outcomes. Nadkarni and Herrmann (2010), for example, explored the relationship between CEO personality and strategic flexibility. Their findings highlighted the importance of CEO personality, with individual personality traits being shown either to enhance or inhibit strategic flexibility within the firm. The study of CEO personality, in

particular, has emerged as an important topic within strategic management (Chatterjee & Hambrick, 2007; Hiller & Hambrick, 2005). Furthermore, conceptually discussed within the study of the micro-foundations of dynamic capabilities, attention is being directed towards the psychological foundations of dynamic capabilities (Hodgkinson & Healey, 2011), and this in turn is providing a platform for academics to explore how an individual difference such as personality might influence an important strategic concept such as dynamic capabilities (Helfat & Petaraf, 2015). However despite initial promising insights, as a field there is still limited understanding of the strategic implications of personality.

As a result, Herrmann and Nadkarni (2014) have called for the need to move away from overly narrow insights towards the application of valid and robust frameworks such as that used within this research, the Five Factor Model of Personality, to understand important aspects of organisational life (see Section 2.4.1).

2.2.1 Defining Personality

Two of the most cited definitions of personality include Cronbach's (1970) definition of personality as 'one's habits and usual styles, but also abilities to play roles', and Allport's definition of personality as 'the dynamic organisation within the individual of those psychological systems that determine his unique adjustment to his environment'. Both definitions capture the internal make-up and unique characteristics of an individual.

As a study of individual differences, it is possible to approach personality from a cognitive perspective. While individuals may have a particular personality profile, what this research positions is the importance of the need to understand how such traits are cognitively expressed (Cantor, 1990) and how this expression could support the development of dynamic capabilities within the firm. This, in

turn, has consequences for how we see personality enacted within the firm through the behaviour and cognitive expression of traits.

2.2.2 Approaches to Personality: Nomothetic and Idiographic

Two approaches to personality exist, nomothetic and idiographic, and both approaches result in different ways of measuring and drawing conclusions surrounding personality. The dominant nomothetic approach to personality is one that views personality as a science, explored through individual differences, or traits, which are measured across a continuum. Traits can be defined 'as a set of behavioural, emotional and cognitive tendencies that people display over time and across situations and that distinguish individuals from one another' (Costa & McCrae, 1992). The nomothetic approach is therefore quantifiable in nature and searches for general laws that are applicable to the wider population. Substantial evidence supporting the nomothetic approach views traits as having predictive power of behaviour (Rushton, Jackson & Paunonen, 1981). The measurement of traits using models such as the Five Factor Model (FFM) is thus widely used to predict specific behaviour in individuals (Rushton, Jackson & Paunonen, 1981). As an alternative approach, the idiographic approach rejects the idea that personality can be measured through quantifying the trait profile of an individual. Instead, the idiographic approach promotes the view that individuals are not a collection of separate traits but are instead a well-integrated organism requiring a detailed review. Experiences and future intentions are considered to contribute to the behaviour we see and thus observe in individuals. The idiographic and nomothetic approach are considered in more detail below.

2.2.3 Idiographic Approaches to Personality

Idiographic conceptualisations of personality refer to more tacit explanations of personality, where personality is considered to be 'idiosyncratically organised within individuals' (Malatesta & Wilson, 1988, p. 92). As a result of this inherent, tacit explanation of personality, the idiographic approach largely rejects the

existence of universally applied traits (Conner, Tennen, Fleeson & Barrett, 2009). The idiographic approach views personality as something that cannot be measured across personality traits but instead must be measured in a manner that allows for examination of a social situation. In support of this view, Mischel, Shoda and Peake (1982) examined the consistency of the conscientiousness trait among college students in the US. They found that students acted inconsistently across situations. An individual may therefore be consistent in his or her approach to one task but not another. Mischel, Shoda and Peake (1982) thus argued that it is not that individuals aren't consistent, but that the situation has the power to influence consistency. In turn, Mischel, Shoda and Peake (1982) promoted the need to study situations and that personality was broader than traits, thus requiring a focus on more observable dimensions such as activities, emotionability and sociability.

The idiographic approach to personality uses research instruments such as interviews and observations to capture the deeper, underlying nature of personality (Pelham, 1993). Broader in its approach, idiographic studies often draw on the measurement of temperaments that provide a wider classification of what is meant by personality (Hampson, 2012). Social cognitive theories of personality epitomise the idiographic approach to personality. One of the central defining features of the social cognitive approach to personality is that interactionism plays a core role in understanding personality (Bandura, 1978). People and their social settings are seen to interact and, in this vein, the sociocultural environment contributes to the development of personality structures. Personality factors, from this idiographic approach, are therefore considered to determine partly the environments in which individuals find themselves and partly how they experience that particular social setting. Promoting the social foundation of personality, the social cognitive approach refers to the ability of individuals to self-reflect in order to develop beliefs about themselves (Bandura, 1999). It is this process of self-reflection that in turn allows for individuals to become motivated and perhaps passionate about a certain social setting or environment (Caprara & Cervone, 2000; Mischel, 1973). The social foundations of personality variables are therefore inherently promoted from this idiographic approach and the cognitive mechanisms of social

competencies underpin the way in which individuals behave. Approaching personality as inherently complex and difficult to measure, researchers employing idiographic approaches seek to understand personality within particular social settings. This interaction between the environment within which individuals operate and personality supports the importance of not viewing personality in an isolated, mechanical manner (Bandura, 1999).

2.2.4 The Nomothetic Approaches to Personality

Despite the value of idiographic approaches to personality conceptualisation and measurement being widely articulated across the field of psychology (Bandura, 1999; Dweck & Leggett, 1988; Mischel & Shoda, 1995), the dominant form of measurement in the field is that of the nomothetic, trait theory approach (Costa & McCrae, 2013). This dominant form of the study of personality is attributed to the predictive power of research instruments such as the FFM, which have been substantially evidenced to predict consequential outcomes for individuals successfully (Roberts et al., 2007). Measurement tools such as the FFM are the product of factor analysis and enable a quantitative measurement of personality, which organisations and individuals can use to predict behaviour in a consistent, applied manner. The measurement of traits is further supported by the validity and reliability of the 'big five', which have been consistently reported in individuals across situations (Costa & McCrae, 1994; Conley, 1985). This, in turn, is supported by empirical evidence showing that traits become more stable over time. From the age of 30 to 35, traits are considered to stabilise, which in turn heightens the predictive power of the measurement of traits (Oltedal & Rundmo, 2006).

Personality traits have been shown to have high levels of longitudinal stability over a prolonged period (Gustavsson et al., 1997; Rantanen et al., 2007; Soldz & Vaillant, 1999). The proven stability of personality traits is a core reason why the measurement of traits is considered to be the most appropriate and dominant approach in workplace applications. This is supported by the work of Cobb-Clark and Schurer (2012), who showed that the big five personality traits

were stable across age groups across a four-year period in a representative sample of working-age adults.

The nomothetic approach to personality is dominant across personality research and has promoted the importance of personality as a research arena (Barrick, 2005). Allowing the conclusive measurement of personality, the field has benefited from the ability to draw conclusions related to differences between individuals. It is these differences, in particular, that, across a workplace setting, have paved the way for a greater understanding of organisational life (Chiaburu, Oh, Berry, Li & Gardner, 2011; Naquin & Holton, 2002; Robertson & Callinan, 1998). The growth of the study of personality is largely attributed to the emergence of the Five Factor Model, which is explained in detail in Sections 2.2.5–2.2.6.

While the nomothetic approach to personality has been praised for its quantitative measurement of personality, criticism has been directed towards the nomothetic approach for its broad measurement of personality using predominately the five factors discussed below. While personality has been shown to have utility in predicting performance and behaviour within the firm, and, in particular has been shown by Barrick, Mount and Judge (2001) to account for additional elements of individual behaviour not accounted for by other tools and methods, it is notable that many of the correlations which exist between personality and performance are not particularly strong. This is likely to be, in essence driven by the complex interplay which exists between predictor variables, of which personality is one and job performance. To overcome this, increased empirical attention must be directed towards further unravelling the meaning and subsequent application of personality in the workplace.

2.2.5 The Measurement of Personality: the Five Factor Model

The Five Factor Model (FFM) of personality has dominated the past two decades of personality research (Goldberg, 1990; McCrae & Costa, 1992). The FFM of

personality developed by McCrae and Costa (1985) has been used to study a wide range of relationships between personality and variables of interest to organisations, including: leadership (Judge & Bono, 2000; Hogan, Curphy & Hogan, 1994), job performance (Barrick & Mount, 1991; Hurtz & Donovan, 2000), employee turnover (Judge, Martocchio & Thoresen, 1997) and job satisfaction (Judge, Heller & Mount, 2002; Hogan & Holland, 2003). In a narrow sense, the FFM of personality 'can be viewed as an empirical generalisation about the covariance of personality traits' (Oliver, Robins & Pervin, 2008, p. 159). According to the FFM, there are five categories of personality traits that can be measured in individuals: extraversion, agreeableness, conscientiousness, neuroticism and openness to experience (Costa & McCrae, 1995; McCrae & Costa, 1997). Much of what psychologists refer to as personality is deemed to be captured by these five traits (John & Srivastava, 1999; Wiggins, 1996). These traits are explored in detail, in Section 2.2.8.

In a broader sense, the FFM captures a vast body of research directed towards the study of traits that has, over the years, been associated with studies of diverse populations, featured case studies and multiple methods of assessment (Costa & McCrae, 1995; Salvato, 2003; Wiggins, 1996). The robustness of the FFM has been widely praised across the literature and the study of personality has moved forward as a result of 'this taxonomic structure becoming widely accepted' (Judge & Bono, 2000, p. 753). In light of this, the FFM is considered to have revolutionised the field of personality psychology (Judge & Bono, 2001). This is captured by Costa and McCrae (1993), who note that the FFM is: 'the Christmas tree on which findings of stability, heritability, consensual validation, cross-cultural invariance, and predictive utility are hung like ornaments' (p. 302).

Substantive findings have supported the FFM, which, in turn, has paved the way for the development and functioning of personality traits across personality research (Barrick, Mount & Li, 2013; Chiaburu, Oh, Berry & Gardner, 2011; McCrae, 2002). However, the FFM itself does not constitute a theoretical approach (Mayer, 1998), but instead can be viewed as implicitly adopting the basic principles of trait theory. Trait theory refers to the contention that

individuals can be characterised in terms of patterns of thoughts, feelings and actions and that traits capturing this can be quantitatively assessed across some degree of cross-situational consistency (Oliver, Robins & Pervin, 2008; McCrae & Costa, 1999). Studies utilising the FFM in turn strengthen the argument that traits exist (e.g. Andreassen, Hetland & Pallesen, 2010; Barrick, Mount & Judge, 2001; Blettner, Chaddad & Bettis, 2012).

2.2.6 'Within'- and 'Between'- Person Variation in Personality

Across the study of personality there is a need to distinguish between 'within-person' and 'between-person' variability (Mroczek, Spiro & Almeida, 2003). The stability of personality over time has long been the centre of personality research and the differentiation of 'within'- and 'between'-person variability is essential in understanding what is being captured by a tool such as the FFM. The FFM focuses on the differences between individuals and treats any variance that occurs within a person as error variance. The FFM therefore allows psychologists to describe individual differences to identity which of the between-person differences captured are relevant to a wide range of studies, including the relevance of personality to organisational life. The between-person variation captured in the FFM therefore allows conclusions to be drawn regarding the role of personality in a variety of settings, including work settings (Costa, 1996; Mount, Ilies & Johnson, 2006).

Trait theory and the FFM place an emphasis on the descriptions of people relative to one another on the basis of relatively stable characteristics/traits. The FFM, in particular, captures individuals on a continuum, allowing for individuals to be considered against population-based norms. The NEO PI-3, the standard questionnaire measure of the FFM, for example, uses a sample population of US citizens in order to determine where an individual fits when compared with the population norm. An individual may therefore be considered to be average in neuroticism when compared to the population norm. By placing an individual on a continuum scale it is possible to have some level of context regarding what that means when compared to average levels.

The FFM does not place an emphasis on within-person variability, something that was prominently studied by Mischel (1973), who argued that there was a need to capture within-person variability, that 'a considerable amount of variation in cognition, affect and behaviour occurs within an individual' and that this variation can be explained by the impact of situation. It can therefore be argued that a focus on between-person variation alone fails to capture potentially meaningful components of personality. This is supported by the work of Fleeson (2001), who showed that within-person variability 'comprises a large part of the total variability in behaviour' (p. 1011). While the majority of personality research, approached from a trait theory perspective, has relied on between-person comparisons, the study of within-person variations has been argued and shown to result in a broader understanding of personality (Fleeson, 2004). The neglect of within-person variation within the FFM is therefore considered to be an inherent weakness of its approach.

2.2.7 FFT Assumptions of Human Behaviour

The trait perspective, from which trait theory emerges, is based upon a set of assumptions surrounding the nature of human behaviour (Oliver, Robins & Pervin, 2008; Pervin, 1993). Five Factor Theory (FFT), in particular, explicitly acknowledges four assumptions about human nature and the way that humans are assumed to be: knowability, rationality, variability and proactivity (Hochwalder, 2000). These four assumptions are implicitly raised within the wider realms of trait research. The first assumption, *knowability*, is the assumption that the personality of an individual can be viewed as the object of scientific study. Differing from those humanistic theories that celebrate uniqueness in individuals (e.g. the work of Costa, 1996; and Sheldon & Kasser, 2001), the FFM assumes that there is much to be gained by the scientific study of personality in individuals and groups (Zimmerman, 2008). The second assumption, *rationality*, is the assumption that people are generally capable of understanding themselves and others around them (Funder, 1995). Despite being an inherent assumption of the FFT, this assumption is in fact an unpopular view, whereby psychoanalysts often argue that people are driven by

unconscious forces and that any level of self-understanding is fundamentally self-deception. The FFT moves away from this thinking by arguing that it is possible to ask people about their own personality. Trait psychologists regularly ask participants to respond to statements that require individuals to self-reflect, and it is this process that seeks to take the often-superficial understanding individuals may have and deepen this through an understanding of the underlying structures of an individual's personality. As a result, the FFT postulates that individuals maintain a cognitive–affective view of themselves, which is accessible to their own consciousness.

The third assumption within FFT is that individuals differ from one another in psychologically significant ways and that these differences can therefore be captured within the FFM. Trait theory is set aside from other studies of personality where philosophical views often reflect the study of personality and human nature itself. The FFM instead captures the dimensions across which individuals may vary. The final assumption within FFT refers to the assumption of *proactivity* and the contention that 'the locus of causation of human action is to be sought in the person' (Oliver, Robins & Pervin, 2008, p. 162). Personality is therefore considered to be something that is actively involved in shaping people's lives and therefore an important phenomenon to be researched (Soldz & Valliant, 1999).

2.2.8 An Exploration of Personality Traits

Personality traits can be defined as 'individual difference variables' (John, Robins & Pervin, 2008, p. 162). To understand the nature of traits and how they can subsequently be operated, there is a need to view personality itself as the 'dynamic psychological organisation that coordinates experience and action' (McCrae & Costa, 1996). The traits present within the FFM are now explored in more detail. As seen in subsequent sections, under each trait/factor there are six facets, measured to define the trait itself. Lower-level facets therefore

combine to shape the wider domain and are used to provide a greater level of detail attributed to each trait.

Factor 1 in the FFM, extraversion, represents the tendency for an individual to be outgoing, and is measured at the facet level through an exploration of warmth, gregariousness, assertiveness, activity, excitement-seeking and positive emotions. An individual scoring high on extraversion is considered to be predisposed to the experience of positive emotions (Watson & Clark, 1997). In a recent study by Nadkarni and Herrmann (2010), CEO extraversion was positively correlated with strategic flexibility. Furthermore, extraversion is often a trait aligned to performance, with Lin and Rababah (2014) arguing that extroverted members within a TMT were more likely to socialise and work with others, which in turn paved the way for improved team performance. The enthusiasm associated with extraversion can be a powerful driver of the team's performance (Palaïou & Furnham, 2014).

Factor 2, agreeableness, refers to levels of trust, straightforwardness, altruism, compliance, modesty and tender-mindedness. Agreeableness, as shown in the work of Giberson et al. (2009), is often associated with leaders who are able to build long-lasting relationships with their TMT, and is commonly used as a predictor of job performance (Ones, Dilchert, Viswesvaran & Judge, 2007). Agreeableness is therefore a trait that is empirically associated with positive relationships, yet is often negatively associated with strategic change as the result of a tendency for compliance (Herrmann & Nadkarni, 2014).

Factor 3, conscientiousness, is measured by the facets of competence, order, dutifulness, achievement-striving, self-discipline and deliberation. In particular, the achievement facet of agreeableness has been correlated to those individuals who demonstrate entrepreneurial spirit (Zhao & Seibert, 2006). Lin and Rababah (2014) found that a TMT comprised of conscientious executives exhibited higher levels of motivation and a greater willingness to accept delegation from others. This promoted the integration of resources and the responsible actions of the team (Conger & Kanungo, 1988).

Factor 4, neuroticism, refers to the emotional stability of an individual. Neuroticism is measured by the facets of anxiety, angry hostility, depression, self-consciousness, impulsiveness and vulnerability. McCrae and Costa (1991) refer to emotional adjustment (lower scores of neuroticism) as the principal trait linked to satisfaction. Neuroticism, the opposite of emotional stability, is a trait that has received considerable attention, particularly in relation to the personality of CEOs (De Vries & Miller, 1986; Hogan & Kaiser, 2005; Peterson, Smith, Martorana & Owens, 2003).

The final factor in the FFM, openness to experience, is measured by the facets of fantasy, aesthetics, feelings, actions, ideas and values. Openness to experience is the only trait, to date, to be correlated with intelligence (Ashton, Lee, Vernon & Jang, 2000; Judge & Bono, 2000). Furthermore, openness to experience is a trait that is regularly linked to creativity and innovation. Schilpzand, Herold and Shalley (2010), in a study of 31 graduate student teams, found that openness to experience was significantly correlated to levels of creativity within the team. In particular, and perhaps most interestingly, the authors (2010) found that diversity across openness to experience within the team was important. They noted that the most creative teams were those that had some members with low levels of openness to experience and others with higher levels. This points towards the importance of varying levels of this trait within the team, which been further supported by Kearney, Gebert and Voelpel (2009), who advocate the need for diverse levels of openness to experience within the team. Most recently, Potoc̃nik, Anderson and Latorre (2015) argued that openness to experience is an important trait to be considered when recruiting for innovation within the firm.

Table 3 provides a more detailed exploration of the meaning behind the individual facets aligned to each of the five traits/domains presented in the FFM, and are taken directly from the work of Costa and McCrae (1992).

Table 3: Meanings of facets in the FFM

Domain	Facet	Explanation of Facet
Neuroticism	<ul style="list-style-type: none"> Anxiety Angry hostility Depression Self-consciousness Impulsiveness Vulnerability 	<p>Anxiety = level of free-floating anxiety.</p> <p>Angry hostility = tendency to experience anger and related states of frustration and bitterness.</p> <p>Depression = a tendency to experience guilt, sadness and loneliness.</p> <p>Self-consciousness = shyness or feelings of social anxiety around people.</p> <p>Impulsiveness = the desire to act on cravings and urges.</p> <p>Vulnerability = general susceptibility to stress.</p>
Extraversion	<ul style="list-style-type: none"> Warmth Gregariousness Assertiveness Activity Excitement-seeking Positive emotions 	<p>Warmth = interest in, and friendliness towards, others.</p> <p>Gregariousness = preference for the company of others.</p> <p>Assertiveness = social ascendancy and forcefulness of expression.</p> <p>Activity = pace of living.</p> <p>Excitement-seeking = the need for environmental stimulation.</p> <p>Positive emotions = tendency to experience positive emotions.</p>
Openness to	<ul style="list-style-type: none"> Fantasy Aesthetics 	<p>Fantasy = receptivity to the inner world of</p>

experience	<ul style="list-style-type: none"> ▪ Feelings ▪ Actions ▪ Ideas ▪ Values 	<p>imagination.</p> <p>Aesthetics = appreciation of art and beauty.</p> <p>Feelings = openness to inner feelings and emotions.</p> <p>Actions = openness to new experiences on a practical level.</p> <p>Ideas = intellectual curiosity.</p> <p>Values = readiness to re-examine own values and those of authority figures.</p>
Agreeableness	<ul style="list-style-type: none"> ▪ Trust ▪ Straightforwardness ▪ Altruism ▪ Compliance ▪ Modesty ▪ Tender-mindedness 	<p>Trust = belief in the sincerity and good intentions of others.</p> <p>Straightforwardness = frankness in expression.</p> <p>Altruism = active concern for the welfare of others.</p> <p>Compliance = response to interpersonal conflict.</p> <p>Modesty = tendency to play down own achievements and be humble.</p> <p>Tender-mindedness = attitude of sympathy for others.</p>
Conscientiousness	<ul style="list-style-type: none"> ▪ Competence ▪ Order ▪ Dutifulness ▪ Achievement-striving 	<p>Competence = belief in own self-efficacy.</p> <p>Order = personal</p>

	<ul style="list-style-type: none"> ▪ Self-discipline ▪ Deliberation 	<p>organisation.</p> <p>Dutifulness = emphasis placed on importance of fulfilling moral obligations.</p> <p>Achievement-striving = need for personal achievement and sense of direction.</p> <p>Self-discipline = capacity to begin tasks and follow through to completion despite boredom or distractions.</p> <p>Deliberation = tendency to think things through before acting or speaking.</p>
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2.2.9 The need to analyse personality at the domain and facet level

In personality trait assessment, there has been a long history of identifying the different levels of trait specificity e.g. Goldberg (1993). Conceptually, this is illustrated by integrating discrete behaviours which form more specific traits and those which build together to develop the broader dimensions of personality. Over time, hierarchal models e.g. Eysenck (1991) have been developed positioning traits as the umbrella overarching personality dimensions with supporting specificity being gained from sub-facets. Traits can thus be positioned as the broadest and most pervasive themes that allow researchers to measure and then interpret the major dimensions of personality at this higher level. Research at the trait/domain level remains most dominant due to the methodological challenges associated with employing facet level research (Anatecola, Mandarelli & Poggesi, 2013). This is supported by a wide range of personality trait studies (Judge et al, 2002; Judge, Higgins, Thoresen & Barrick, 1999; Barrick, Stewart & Piotrowski, 2002).

Human behaviours, as discussed in the work of Paunonen et al (2003) are 'quite complex' and this is a result of their many determinants. Some determinants reflect innate physiological factors and of particular interest here is the inherited

behaviour predispositions, including traditional personality traits. To predict behaviour, the determinants of behaviour must be known. Such determinants can then be measured and used to make a prediction. However, a central issue in personality research is knowing which personality dimensions are most salient. To aim to overcome this, this research follows the dominant trait approach, which Paunonen et al (2003) argues allows for a simplified approach to behaviour prediction aligned to the personality hierarchy previously discussed.

Personality facets are considered by Ones and Viswesvaran (1996) to provide a more fine-grained analysis of an individual's personality and thus allow the complexity of an individual's thoughts, feelings and behaviour to be more fully captured. While at the trait level it is possible to build a general picture or pattern of an individual's personality the facet level is required to align more to the complexity of individual behaviour and the context of such where the construct of a given trait can be broken down into more specific personality dimensions. At the more specific, lower level unit of personality it is possible to capture the differences which exist under the umbrella of a given trait.. The value to academics thus stems from being able to see the different ways a trait such as extraversion may play out and in turn be used to predict behaviour. Facets are considered by Samuel & Widiger, 2008 to be a useful way of predicting how an individual may behave in a more focused manner. Evidencing such a study, Timmerman (2004) presents a paper, which measures personality domains, and facets of 203 call centre workers in order to explore the relationship between personality measures and performance ratings. In his work, Timmerman (2004) found that conscientiousness was significantly correlated with job performance ratings, when this was explored further at the facet level it was revealed that only one facet was positively related to performance, the facet of trust. This highlights how by coming down to the facet level, the interpretation of the findings changes. At the facet level, the author is able to highlight the importance of trust and use this to guide future recommendations for managers to enhance job performance.

Studies at the facet level thus supports a more detailed interpretation supporting prediction. For example, if we take an individual who is high in extraversion, the actual interpretation of this is going to be led by how they have scored in individual facets e.g. whether they are high in extraversion due to higher than average anger or anxiety facet. This breakdown at the facet level begins to unravel more detail about an individual and places us closer towards a deeper appraisal and/or prediction of behaviour. This in turn presents an argument for needing to analyse personality at both the domain and facet level.

To further explore the issue of using personality domains versus facets, the conceptual paper by Paunonen, Haddock, Forsterling and Keinonen (2003) must be referred to. As a seminal piece of work contributing to the discussion of broad versus narrow exploration, Paunonen et al (2003) advocate the importance of facet level research due to facets underlying a personality trait not being perfectly correlated. This in turn allows for trait specific variance, which can be predictive of certain behaviour. There are many benefits in turn of using lower level facet measures including an increased accuracy in prediction and an improved understanding of behaviours. This is evidenced in the work of Paunonen and Ashton (2001) where in one study they found no correlation between openness to experience and grade point average across a large sample of university students. In contrast, when a facet scale was used, the facet of openness to experience, need for understanding was shown to be a strong predictor of grade point average. This showed that by combining the facets into one domain, the predictive utility of one facet was cancelled out. This drives the use of facet and domain level personality exploration and is supported by those academics which argue that focusing upon domain measures only is 'counterproductive' from a behaviour prediction and behaviour understanding point of view (Mershon & Gorsuch, 1988; Rush & King, 1994; Reynolds & Clark, 2001; Paunonen & Nicol, 2001).

Peterson, Smith, Martorana and Owens (2003) examine the impact of Chief Executive Officer personality on Top Management Team dynamics and do so through a measurement of 17 CEOs at the domain level only. In doing so, they are able to draw generalised predictions of behaviour related to the influence

CEO personality has on team dynamics and organisational performance e.g. CEO agreeableness was shown in the study to be significantly related to concern for legalism within the Top Management Team. These broad level links however would benefit from a deeper level exploration, achieved through an analysis of facets, something not possible within the methodological approach taken by Peterson et al (2003) due to their focus on gaining personality information on the CEOs from the perceptions of others. The facet level presents a deeper, internal perspective which would be difficult for others to perceive or report on. Aligned to the discussions above and the work of Paunonen and Nicol (2001) the study by Peterson et al (2003) may be missing strong relationships due to this focus at the domain level alone. At this level however it is possible to make some predictions at the trait level to some other factor, in this instance, TMT dynamics/performance. In exploratory work, to take this further there is a need to examine the links at the domain level as a starting point and then support further analysis/interpretation at the facet level. This is required to ensure that the predictive validity of facet level measures are not lost.

Nadkarni and Herrmann (2010) also study at the domain level and do so to investigate the relationship between CEO personality, strategic flexibility and firm performance. With an aim to develop theory, Nadkarni and Hermann stay at the domain level to be able to draw generalised links between dimensions of CEO personality across the five domains and strategic flexibility. While on the one hand this reduces the complexity of the data being captured, it also allows for the researchers to establish inherent links which can be used to provide an initial platform upon which something link personality and flexibility can be interrelated and explored. Staying at this level, the researchers are able to develop hypotheses at this domain level and are able to show that the personality of a CEO influences firm performance by fostering strategic flexibility. They for example found that conscientiousness undermines firm performance by inhibiting strategic flexibility. At this level, it tells us that there is an initial link here and tells us something about how the behaviour of the CEO influences an organisational level phenomenon such as flexibility. If this had been studied at the facet level then the authors would have been able to take this one step further to understand if a particular facet of conscientiousness was

negatively influencing flexibility. By remaining at the domain level, the complexity of behaviour cannot be unravelled but the researchers are still able to make positive contributions to personality research by drawing out important and valid links.

Palaiou and Furnham (2014) provide an example of an empirical piece of work which examines personality at the facet level. Specifically, the authors examine personality facet differences between CEOs and employees across five work sectors. Translating the big five traits to the NEO sub facets, the authors were able to draw conclusions related to how individual facets differed across professions. For example, under the facet of enthusiasm, CEOs had higher scores than engineers but lower scores than marketing professionals. By taking the study down to this specificity the authors were able to understand the differences across professions. While recognising that personality traits are not the only factors that may engage/influence a specific behaviour within an organisation, by studying this at the facet level, the authors are able to examine in more detail the personality inputs influencing behaviour outputs.

The need to analyse personality at the domain and facet level, where methodologically viable, places the researcher in a position where they have a picture of an individual which moves away from domain only interpretations. The significance of this is that it provides a more fine grained analysis which tells us more about the individual make-up of an individual supporting a more specific prediction of behaviour. To illustrate this, if a researcher has only captured domain level data and is faced with the profile of a CEO which reflects that they are 'average' compared to norms across all five domains then this tells us little about the make up of that individual. If facet level data was also collected, the researcher would be able to delve deeply into perhaps individual facets which stand out more so than the average level traits. As discussed in the limitations section of this research however, there are methodological challenges associated with the collection of data at the domain and facet level.

2.2.10 Criticisms Directed Towards the FFM

Since its development, the FFM has faced objections from across the field of personality psychology (Mershon & Gorsuch, 1988; Zuckerman et al., 1993). While these objections have largely been addressed by Costa and McCrae (1998), this section refers to the specific objections directed towards the model. These objections are in addition to the limitation discussed previously in Section 2.3 regarding the limited focus on between-person variation.

One of the central objections directed towards the model is that the FFM has too few factors present within it, which is considered by Judge and Bono (2000, p. 754) to be 'one of the most prominent criticisms of the FFM'. This criticism stems from the viewpoint offered by Block (1995, p. 208) that 'for an adequate understanding of personality, it is necessary to think and measure more specifically than at this global level if behaviours and their mediating variables are to be sufficiently, incisively represented'. The current study of personality within the FFM is thus considered to provide 'too coarse a description of personality' (Judge & Bono, 2000, p. 754). This in itself, however, is not an objection that advocates of the FFM would dispute; in fact, as explained by McCrae et al. (1986), it was never intended that the FFM would provide a complete, exhaustive description of personality. McCrae et al. (1986) note that 'the five factors give a complete characterisation of the person only at a global level. The factors represent groups of traits that co-vary, but are not necessarily interchangeable' (p. 386). As such, there is a need to understand that a moderate score in any of the five factors could be interpreted in different ways. However, as a result of the wealth of data supporting the comprehensiveness of the FFM, it is unlikely that a six-factor model of personality exists. Any previously proposed factors have been rejected as a result of factors such as values or culture being considered a 'syndrome of several independent characteristics related to different factors rather than an internally consistent dimension of personality' (McCrae & John, 1987, p. 190).

An alternative objection is that the FFM has too many factors (Zuckerman, Kuhlman & Camac, 1988). Gough (1987) and Tellegen (1982) argue that the facets related to neuroticism are rare and that it is not justifiable to include a separate trait for emotional stability. Instead, Digman and Inouye (1986) argue that it might be possible to reduce the five factors to three by conducting a higher-order factor analysis. In response to these suggestions, McCrae and Costa (1987) have shown that in the original development of the model, it was only when 5 factors were extracted from the 80 adjective pairs used that a near-perfect match was found. This, in turn, was supported by Borkenau and Ostendorf (1990) and Goldberg (1990), who all agree that five factors is the correct number to explain personality. The FFM is therefore founded on an understanding that five factors exist as a result of 'empirical fact' (McCrae & Costa, 1987, p. 194).

Discussions surrounding whether the FFM has too many or too few factors are indicative of an inherent contradiction across personality research; however, it is necessary to note that the criticism directed towards the FFM has reduced since the late 1990s, particularly with regards to debates surrounding the number of factors; this is considered to be driven by empirical support and validation of the model and its theoretical underpinnings.

Moving away from the number of factors within the FFM, a further criticism refers to the problem of explanation. As a descriptive taxonomy, the FFM captures what some refer to as surface characteristics that offer little in terms of explanation. In contrast, more causal taxonomies such as those seen within the work of Eysenck (1991) provide deeper explanations of the reasons or causes of human behaviour. The inherent issue of explanation can therefore be raised when considering the value of the FFM, which offers a platform for both prediction and description but does little to move towards a platform of explanation and why humans behave in the way they do (McAdams, 1992).

More generally, criticism of the FFM stems from the way in which personality is presented in the model. Represented in the trait lexicon, the FFM is often

criticised for its somewhat static appraisal of personality (Terracciano et al., 2006). As presented in the work of McCrae and Costa (1999, p. 145), personality traits stabilise from the age of 30 and remain stable thereafter. However, in response to this claim, Soldz and Vaillant (1999) failed to find support in a re-test for the stability of two of the five dimensions: agreeableness and conscientiousness. This, in turn, pointed towards the idea that the five personality traits within the FFM are actually subject to change across an individual's adult years. In support of the work of Soldz and Vaillant (1999), mounting empirical evidence supports the idea that changes in personality traits take place over time, as seen in the work of Cattell et al. (2002) and Roberts et al. (2006). The study by Roberts et al. (2006), in particular, showed significant changes to mean-level traits across the lifespan of an individual. An interesting finding was related to how openness to experience was seen to increase during adolescence but then decrease during old age. As a result of this research, McCrae and Terracciano (2005) acknowledged that increases in agreeableness and conscientiousness can occur in the adult years. As a result of this body of research, despite the continued popularity of the FFM, its validity over the years has been questioned (Cattell & Cattell, 1995; Eysenck, 1992). At present, however, no concrete alternatives have come near to taking on the power and dominance of the FFM and, as such, it remains a powerful model from which to explore personality (DeShong, Grant & Mullins-Sweatt, 2015; Kluemper, McLarty & Bing, 2015; Phipps, Prieto & Deis, 2015).

2.3 The Application of the FFM: The Importance of CEO Personality

The FFM has been widely applied and used in a number of empirical studies. Most notably for this research, the FFM has been applied to understanding the importance of the CEO personality within the firm (Giberson et al., 2009; Herrmann & Nadkarni (2010; 2014).

Upper Echelon (UE) Theory introduced in the work of Hambrick and Mason (1984) argues that key decision-makers within the firm interpret organisational situations through lenses that are formed by individual attributes, including

experience and personality. In turn, as argued by Gerstner, König, Enders and Hambrick (2013, p. 258), it is these 'highly personalised construals that guide executives' actions'. Individual characteristics vary, resulting in CEOs viewing situations in different ways, which is important to this study, as it influences the extent to which CEOs place emphasis on the development of dynamic capabilities within the firm. The personality of a CEO reflects a more sophisticated examination of executive make-up, which moves away from the more demographic attributes commonly explored in the literature, for example, tenure and education (Carpenter, Geletkanycz, & Saunders, 2004; Resick, Whitman, Weingarden & Hiller, 2009). It does so by promoting an examination of how the personality of a key leader within the firm results in certain behaviours and thus action within the firm; for example, Resick et al. (2009), in a study of 75 CEOs of major league baseball organisations, used personality and related it to leadership style. The authors were able to demonstrate the importance of understanding the personality of the CEO and the strategic outcomes of personality traits shown across the diverse sample population. While demographics are important and still fundamental to behaviour and human experience, personality offers an explanation of human behaviour and experience that looks at differences and why people are the way they are. This offers something more detailed and behaviour-oriented than demographic variables alone.

CEOs are typically considered to be in the strongest position within a firm to influence strategic, organisational outcomes (Von den Driesch, Da Costa, Flatten & Brettel (2015). Consequently, CEOs appear to be the most influential in fostering and deploying dynamic capabilities (Hiller & Hambrick, 2005). The actions taken by CEOs are often the result of the way in which the CEO deals with information overload and competing objectives within the firm. As such, Carpenter, Geletkanycz and Saunders (2004) argue that the respective personalities of CEOs in shaping the actions they take become important. It is, however, also important to recognise that it is possible that the CEO may not play as dominant a strategic focus as once suggested, fuelled by an increase in attention directed towards shared leadership, which argues that leadership is

not a focus of concentration at the top of the firm alone (Wang, Waldman & Zhang, 2014).

UE research views organisational outcomes as a reflection of the values and cognitive foundations of powerful actors within the firm (Hambrick & Mason, 1984). CEO characteristics and individual differences thus provide an important basis from which to explore strategic decision-making. In light of increasingly competitive and turbulent business environments, there is a need to focus on how to sustain competitive advantage, and in response to this the UE community examines how human capital supports the obtainment of sustainable competitive advantage (Datta & Iskandar-Datta, 2014). Highlighting the important role of the CEO, Coff and Kryscynski (2011) called for more research to be carried out on how CEOs influence firm-level outcomes.

Serving a unique organisational role, CEO personality characteristics 'are not only reflected in their personal preferences and behaviours, but also in the strategies, structure, and performance of the organisations they lead' (Resick, Whitman, Weingarden & Hiller, 2009, p. 1365). Importantly, as explored in the work of Miller and Toulouse (1986, p. 1389), the relationship between CEO personality and organisational characteristics, such as structure and strategies, was considered to be 'somewhat more significant in dynamic environments'. This finding paved the way for research to be conducted exploring the personality of key decision-makers and strategic actions in changing and increasingly dynamic business environments. Supporting this, in a recent study by Nadkarni and Herrmann (2010), CEO personality was shown to be a driver of strategic flexibility. CEO personality and its influence on firm performance is an area that has begun to gain attention but is still a limited area of study (Miller & Toulouse, 1986; Peterson, Smith, Martorana & Owens, 2003). Exploring the role of the CEO further, more recently Herrmann and Nadkarni (2014) referred to the dual role of CEO personality, arguing that while some personality traits were needed to initiate strategic change, these traits differed to those required to improve the performance effects of the change implemented. This work thus showcased the importance of identifying which personality traits had a relationship with strategic change. The opposing effects of different personality

traits is an interesting area of research and one that requires scholars to consider the influence of personality on wider organisational outcomes.

To date, individual CEO personality traits have been empirically explored in relation to a number of firm-level outcomes. Of the big five traits, neuroticism remains the most commonly explored in relation to CEOs (Chatterjee & Hambrick, 2007; Lubit, 2002; Maccoby, 2000). Chatterjee and Hambrick (2007) explored the effect of CEO neuroticism on a firm's strategy and found that higher levels of neuroticism were positively related to strategic dynamism. Linked to fluctuating organisational performance, neurotic CEOs were seen to favour bold actions, resulting in either big wins or big losses. Interestingly, however, the study was unable to support the contention that neuroticism was a driver of firm performance, with the authors concluding that 'firm performance is generally no better or worse than firms with non-neurotic CEOs' (Chatterjee & Hambrick, 2007, p. 351). This finding could, however, be a result of the methodology employed in which unobtrusive measures, including the prominence of the CEO's photograph in annual reports, was examined. More concrete, quantifiable measures such as the FFM provide a platform for conclusive results to be gained to avoid ambiguous, interpretive findings. While neuroticism is commonly used to discuss destructive behaviour within organisations, including intimidation and deference, Barnard (2008) takes a more rounded approach in which four of the five facets measuring neuroticism are shown to have positive consequences for the organisation (all facets apart from depression). Barnard (2008) argues that while neuroticism can generate harmful consequences for the firm it can also have positive consequences. The work of Barnard (2008) thus reflects the need to consider context in order to determine how individual facets within a trait can result in differing outcomes. The work of Barnard (2008) therefore reinforces the complexity of studying personality. This is reflected in the work of Papadakis and Barwise (2002, p. 83), who state that personality, when explored in relation to strategic decision-making, must be 'considered in conjunction with the broader context'.

While the majority of empirical research supports a link between CEO personality and strategic outcomes, and thus the UE perspective, some

empirical studies argue that CEO personality does not matter (Papadakis & Barwise, 2002). For example, Papadakis and Barwise (2002) were unable to show that CEO personality characteristics had any significant influence on strategic decision-making. This finding, while not supporting the UE perspective, did provide an interesting outcome driving the need to focus on CEOs and TMT simultaneously in empirical studies. When studied together, Papadakis and Barwise (2002) argue that researchers are able to gain a more reliable insight into how key decision-makers within the firm work together. In turn, this highlights the need to explore an individual CEO personality within a particular context and to explore personality at the team level.

2.3.1 Personality at the Team Level

LePine, Buckman, Crawford and Methot (2011) note that in the last half century there has been 'a great deal of interest in the role of personality in teams' (p. 311). In particular, a significant amount of research has been conducted exploring the relationship between personality composition and team performance (Barrick, Stewart, Neubert & Mount, 1998). For example, Van Vianen and De Dreu (2001) highlight a positive relationship between high mean levels of extraversion and emotional stability (the low end of neuroticism) and the positive presence of social cohesion across the team. With organisations increasingly adopting team structures, the role of personality in team contexts has become an emerging area of research (Colbert, Barrick & Bradley, 2014; Stewart, 2003).

Two central perspectives underpin the role of personality in team performance. The first perspective promotes the examination of how teams create an environment, which influences the relationship between the personality traits of an individual and individual performance. The other perspective examines how individual traits can be aggregated to explore team-level phenomena, which in turn affects organisational performance. Personality can thus be explored at both the individual and team level, and both levels are important in shedding light on macro phenomena within the firm (Kozlowski & Klein, 2000).

Research examining relationships between individual traits and individual performance in team settings is plentiful in personality research (Barrick, 2005; Morgeson, Reider & Campion, 2005). Such analysis suggests that teams create an environment that alters the impact individual traits have on performance. The team is therefore viewed as a phenomenon, which influences individual-level personality relationships. In a meta-analysis conducted by Mount, Barrick and Stewart (1998), relationships were explored between FFM traits and job performance in teams. Agreeableness was shown to have the strongest impact on team performance, closely followed by emotional stability. This was supported by Neuman and Wright (1999), who also showed that agreeableness supported performance. Agreeableness has therefore been shown to be a predictor of how well individuals perform within a team. Its role is therefore magnified in team settings, which in turn raises a question about why some traits are more strongly linked to performance when individuals work in teams. To explore this, Barry and Stewart (1997) found that the social environment within which teams exist had an impact. Furthermore, team-level features such as the level of autonomy within the team can allow for the expression of traits to be heightened. Leiter, Bakker and Maslach (2014) suggest that teams create a social setting, which heightens the link seen between traits and behaviour. Individuals may have a desire to be accepted by the team, which in turn creates a situation whereby individuals enhance their personal identity to fit in with the team. To explore this further, it is possible to look at how traits form at the important team level. In particular, research has been directed towards traits at the TMT level (Barrick, Bradley, Kristof-Brown & Colbert, 2007; Le Pine, Buckman, Crawford & Methot, 2011).

As described in the work of Kozlowski and Klein (2000), lower-level phenomena, that is individual personality, evolves into higher-level phenomena (team personality) through team composition. At the team level, agreeableness has been shown to be a critical trait for team success (Neuman, Wagner & Christiansen, 1999). Predicted at the domain level, Neuman and Wright (1999) showed that an individual with either a very high or very low score in agreeableness would have a large impact on the level of cooperativeness within

the team, thus influencing team performance. Teams with higher aggregated levels of agreeableness are shown to work better together (Bradley, Baur, Banford & Postlethwaite, 2013; Colbert, Barrick & Bradley, 2014). Bradley et al. (2013) support this finding, stating that agreeableness is a socially oriented trait and thus one that is positively related to team performance.

Using personality as a basis for the selection of teams, Kichuk and Wiesner (1997) argue that personality can be used to determine optimal team composition. The authors (1997) confirm previous findings by articulating that successful teams have high levels of extraversion and lower levels of neuroticism. Measured at the team level, this study confirms the consensus for the measurement of personality at the team level by aggregating individual-level measures. The measurement of team-level personality by combining individual-level traits is a well-established methodological approach across the literature (Barrick & Ryan, 2003).

2.4 Team Composition

Aligned to an increase in research exploring the link between the TMT and strategic outcomes, increased research has been directed towards the nature and influence of the TMT team composition. Team composition can be defined as 'the configuration of member attributes in a team' (Levine & Moreland, 1990, p. 585) and is widely referred to as having a 'powerful influence' on team outcomes (Kozlowski & Bell, 2003). Across the team composition literature, differentiation exists between surface and deep-level composition variables. Surface-level composition factors refer to demographic characteristics such as age, team size or education levels within the team. Deep-level composition factors, on the other hand, are deeper, more psychological factors, such as personality profiles within the team (Bell, 2007).

In a study by Kor (2006) examining why firms differ in their levels of research and development investment, he (2006) sought to unravel the direct and interactional effects of TMT composition and board composition. It was found

that firms had lower levels of research and development investments where the TMT had high levels of tenure, shared experience and functional heterogeneity. Kor (2006), in turn, suggested that high levels of tenure restricted the capacity for innovation and research and development within the firm.

Team composition has been widely explored in relation to team performance. In a study by Higgs, Plewnia and Ploch (2005), the influence of team composition on task complexity was tested. In a study of 28 teams consisting of 270 members, Higgs, Plewnia and Ploch (2005) found that diversity within the team was positively correlated to task performance on those tasks that were complex in nature. This finding is, however, one from which it is difficult to generalise as a result of all teams in the study coming from one organisation. This, in turn, limits the influence of additional team composition factors and environmental influences.

One additional composition factor is the role of gender within the TMT. Parola, Ellis and Golden (2015) studied how gender diversity within the TMT impacted the merger and acquisition process. They did so through a study of 310 acquisitions by Fortune 100 companies. The results of their study supported the idea that gender diversity in the TMT can be a double-edged sword. Parola, Ellis and Golden (2015) showed that while gender diversity is beneficial to pre-integration performance, it can hinder post-integration performance. What the study therefore raises is the need to consider this important compositional factor within the TMT.

Overall, the personality of team members affects the way in which teams interact. The mix of personality traits within the TMT is considered to be critical and an important team composition variable (Barrick, Stewart, Neubert & Mount, 1998; Le Pine, Hollenbeck, Ilgen & Hedlund, 1997).

2.5 The CEO-TMT interface: CEO personality and TMT dynamics

While UE research treats the CEO and TMT collectively as the dominant coalition, when the CEO is separated from his or her TMT it is possible to see how he or she is able to influence dynamics within the TMT. This CEO–TMT interface is considered to be particularly salient by Peterson et al. (2003), who note the need to explore the effects of CEOs on firm-level outcomes through TMT dynamics. As an individual within the firm, the CEO is considered to have a great influence on those with whom he or she works directly, namely the TMT. This relationship is considered by Zaccaro and Klimoski (2002) to be stronger than any other managerial relationships within the firm, which are often constrained by additional managerial input throughout the different levels of the firm.

Hambrick (1994) argued that ‘the top group leader has a disproportionate, sometimes nearly dominating influence, on the group’s various characteristics and outputs’ (p. 180). As such, it is possible to consider TMT characteristics as being traceable back to the CEO (Ling, Simsek, Lubatkin & Veiga, 2008). Personality provides a platform from which to explore how the personality of the chief leader, the CEO, can be linked to dynamics present within the TMT. Existing research has explored how the traits present within the FFM can be linked to TMT dynamics.

As found within the work of Peterson et al. (2003), TMTs led by conscientious CEOs were found to be significantly related to TMT-level concern for control over their environment and legalism. Highly conscientious individuals are often associated with a need for structure, which in turn relates to a desire to have control over TMT dynamics (Hogan & Onrs, 1997). Satisfaction, as presented in the work of Costa and McCrae (1988), is derived from such control, and this is supported by Miller and Toulouse (1986), who showed that CEOs high in achievement motivation, a facet of the wider domain of conscientiousness, prefer to centralise authority. Authority under conscientious CEOs is therefore concentrated within the TMT. Conscientiousness has also been linked to adaptability, with LePine and Van Dyne (2001) finding that individuals with low

conscientiousness were able to adapt better to changing situations. Nadkarni and Herrmann (2010) support this finding, arguing that CEO conscientiousness is negatively related to strategic flexibility. TMTs under conscientious CEOs may be more risk-adverse and thus less willing to adapt to change because of the resulting lack of control. In turn, O'Reilly, Doerr, Caldwell and Chatman (2014) found that under conscientious CEOs, cultures were seen to be more rule-oriented in nature. This focus on rules and structure could in turn have implications for the extent to which CEOs deal with increased adaptability and dynamism in the wider business environment.

Neuroticism is a trait that is well discussed in relation to CEOs (Felfe & Schyns, 2006; Den Hartog & De Hoogh, 2009). Peterson et al. (2003) found that lower levels of neuroticism in CEOs were related to team cohesion and leader dominance. Despite previous studies articulating a link between neurotic CEOs and risk-taking, Peterson et al. (2003) were not able to provide support for this argument. Instead, they (2003) found that neuroticism was not significantly linked to changing levels of risk-taking within the TMT. Despite a leadership myth surrounding the presence of neuroticism in CEOs, research supports that emotional stability (the lower end of neuroticism) is one of the most important drivers of successful leadership (Bass & Stogdill, 1990). Barrick, Stewart, Neubert and Mount (1998) found that high levels of neuroticism within a team were related to low levels of social cohesion and thus lower levels of team performance. This is reiterated by Lin and Rababah (2014), who show that neurotic CEOs have a negative effect on levels of psychological empowerment within the TMT. Noting that psychological empowerment mediates the quality of the relationship between the CEO and TMT, this finding supports the value of more emotionally stable CEOs (Lin & Rababah, 2014).

CEOs are often characterised as being extrovert. Often related to dominance, CEOs high in extraversion are considered to be directive and dominant with regards to strategic decision-making (Herrmann & Nadkarni, 2014; Peterson, Smith, Martorana & Owens, 2003). Linking this to the CEO–TMT interface, CEOs high in extraversion are considered to be forceful in the communication of their ideas, which can in turn be linked to TMTs feeling unable to contradict the

opinions of their CEO (Judge, Bono, Ilies & Gerhardt, 2002). Ling, Simsek, Lubatkin and Veiga (2008) note that in a period of change, team members often appreciate an extroverted and thus strong and energetic leader.

In a study by Buyl, Boone, Hendriks and Matthyssens (2011), CEO characteristics were shown to moderate the relationship between the TMT and firm performance. Through the interaction of TMT members with the CEO, firm performance was influenced. As a result, those traits that promote social cohesion and intractability are considered to create an environment where the CEO and TMT are able to draw on each other's shared experience.

While the CEO–TMT interface is widely explored, very few studies consider CEO personality and its relationship to the personality of the TMT. CEO personality instead is linked to TMT dynamics without consideration of personality. A research gap therefore exists to explore the extent to which similar personality profiles exist across the CEO and his/her TMT and the influence this has on dynamic managerial capabilities within the TMT. CEO personality is therefore considered in relation to personality treated at the TMT level. This is explained in more detail below.

Difference scores provide a methodological opportunity to further explore the CEO-TMT interface.

Difference scores have been 'ubiquitous' in organisational behaviour research (Edwards, 2001). Examples of their application include person environment fit as a predictor of attitudes and wellbeing (Chatman, 1989) and employee expectations as a predictor of turnover and commitment (Porter & Steers, 1973; Wanous, Poland, Premack & Davis, 1992). Typically used to represent the congruence between two constructs, difference scores are regularly treated as a concept in their own right and as a variable that has been formed by subtracting one variable from another i.e. $\text{Difference Score} = \text{Var1} - \text{Var2}$. Difference scores as highlighted by Edwards consist of 'algebraic, absolute, or squared differences

between two measures or the sum of squared or absolute differences between profiles of measures' (p.351). Reflecting upon the existing work of Edwards (1991) and Spokane, Meir and Catalano (2000) the use of difference scores within the current study has emerged from a want to capture the difference in personality traits/facets t-scores between the CEO and his/her TMT in order to see if this impacts upon levels of sensing, seizing and transforming within the TMT. To do so, the work of O'Reily, Chatman and Caldwell (1991) and specifically his methodology was followed. In his work, O'Reily, Chatman and Caldwell (1991) uses difference scores to capture the similarity between employee and organisational values. This work was directly relevant to this study as it provided a framework upon which to use difference scores within the present study. In addition, the work of Edwards (2001) was also used to provide a starting point for learning about the use and application of difference scores.

A measure of difference is important most notably due to the separation of the CEO and TMT in the first instance. Difference scores were therefore used to understand if a similarity or difference in personality scores had any impact on the overall team reporting of sensing, seizing and transforming. The methodological decision to calculate difference scores stemmed from a lack of alternative to difference scores as highlighted in Edwards and Parry (1993) who argue that 'few viable alternatives have been proposed' (p. 1577). While polynomial regression equations is one possible alternative, Edwards and Parry (1993) go on to state that this alternative is one, which can be difficult to interpret. Polynomial regression equations permit direct linear tests of the relationships which difference scores are used to represent but do so in a way which replaces difference scores with component measures that constitute difference with the product and outcome of such measures. As such, it becomes a multi-dimensional exploration.

A methodological consideration was therefore made in this research to ensure that if difference was to be calculated it was an efficient calculation, which allowed for difference to be captured and the outcome of difference to be discussed. The use and application of difference scores was further supported by an examination of existing methodologies including notably the work of

Lubatkin, Simsek, Ling and Veiga (2006). In their work, difference scores were used to examine top management team behavioural integration and its relationship with organisational ambidexterity. This was a useful paper and which provided instruction surrounding the interpretation and meaning of difference. Further, working with top management teams, the work of Lubatkin, Simsek, Ling and Veiga (2006) was highly relevant due to their focus on looking at behavioural differences and the outcome of this in the form of a wider organisational issue.

Griffin, Murray and Gonzelez (1999) outline the community of difference scores and highlight their usefulness when indexing the similarity or dissimilarity of two person relationships. In this case, difference scores have been calculated to see how the personality profile of the CEO differs to that of his/her TMT (treated as a collective).

The calculation of difference scores is theoretically underpinned by the upper echelons perspective where the CEO-TMT interface is often explored and interpreted e.g. Ling, Simsek and Lubatkin (2008), Peterson, Smith and Martorana (2003) and Hiller and Hambrick (2005). Reflecting upon the work of Simons, Pelled and Smith (1999) difference matters and is a particularly useful measure when examining top management team diversity. Difference matters to our understanding of TMT diversity and in this research the CEO-TMT interface is examined. Moving away from the conceptual treatment of the TMT as all members being equal, this research separates the CEO away from the TMT and does so to understand if differences impact upon team level outcomes. Different personality profiles i.e. personality traits and facets can be used to understand how such differences impact upon sensing, seizing and transforming self-reported by the TMT. Inter-individual differences between the CEO-TMT are important and are so due to the influence the CEO is considered to have over his/her TMT. Further, as highlighted in the work of Ling, Wei, Klimoski and Wu (2015) dissimilarity matters. They argue that dissimilarity in demographics is needed in order to stimulate positive firm performance. This therefore positions difference as mattering to organisational success. Difference is an important measure as it allows the researcher, to explore the association between

differences in personality and self-reports of sensing, seizing and transforming. This allows the researcher to understand the association between difference and team outcomes. As a team diversity measure, difference scores are in themselves a measure of diversity thus allowing the researcher to discuss the difference personality diversity makes to the self-reports of dynamic capabilities. This difference is important as it paves the way for a further understanding of the nature of interaction and the consequence of such between the CEO and TMT interface (Cady & Valentine, 1999). For example, is difference in a particular personality trait or facet a predictor of higher/lower levels of sensing, seizing or transforming? If difference matters then this further drives the need to separate the CEO away from his/her TMT.

Within the current study, difference scores were calculated by measuring the NEO personality profile of the CEO in order to give a t-score across the five domains and thirty sub-facets. The difference was then calculated between the t-score of the CEO on a particular domain or facet and the t-score of the TMT (personality measured individually but interpreted collectively at this level). This difference score allowed for the researcher to see how similar or different was the personality profile of the CEO in comparison to his/her TMT. Such information is useful as it allows for an interpretation as to whether CEOs more similar to their TMT are associated with particular dynamic managerial capabilities. For example, if the CEO and TMT have similar levels of conscientiousness does this have an implication for how/or what dynamic managerial capabilities are self-reported?

2.6 Operationalising personality at the team level

Researchers commonly use three different methods and measures for operationalising team composition: mean, standard deviation and min-max. Of these, the most common form of operationalisation is to calculate a mean score of individual measures (Barrick, Stewart, Neubert & Mount, 1998; Mohammed & Angell, 2004; Williams & Sternberg, 1988). By aggregating individual differences to the team construct by using mean, it is assumed that the amount of a characteristic possessed by each individual increases the collective pool of that characteristic within the team. For example, the higher the mean level of

neuroticism across individuals within the team, the higher the collective trait of neuroticism. More of a given trait can therefore be deemed to be better or worse for the team, which opens up the opportunity for empirical examination. Mean-level interpretations of personality therefore do not take into account how traits are distributed, but instead look at the collective pool and how this relates to team dynamics. As a method of operationalisation, this can be problematic as a result of the potential for it to mask important information, related to the spread of personality traits across the team. A high mean score of neuroticism could reflect one team member with high levels of neuroticism, thus raising the collective pool of neuroticism within the team, or it could reflect strong levels of neuroticism throughout the team. Mean-level interpretations therefore do not differentiate between the two.

However, despite not accounting for diversity, mean scores do provide a platform from which to operationalise team composition successfully. Neuman, Wagner and Christiansen (1999) refer to the idea of Team Personality Elevation (TPE) and how this refers to the team's mean level of particular personality traits. A high mean score on extraversion does not therefore imply that all members score high on this trait, but instead refers to some members elevating the average for the team. Mean-level methods of team operationalisation and team personality elevation have received attention and support from a number of studies, including Morgeson, Reider and Campion (2005) and Peterson, Smith, Martorana and Owens (2003). In particular, the work of Klimoski and Koles (2001) and Peterson, Smith, Martorana and Owens (2003) can be used to support the idea that when examining the relationship between the CEO and his/her TMT, and how this relates to stated organisational phenomena, there is a need to predict this on the examination of means. Using mean-level interpretations, it is possible to explore in this study whether teams with higher levels of one particular trait have higher levels of sensing, seizing or transforming.

The second method to operationalise team composition focuses on the highest and lowest individual trait scores within the team. Using min-max measurements, an insight is gained into how the highest score of one individual

possibly impacts the way in which the team operates. In this case, this information could be used to ascertain how the highest level of a trait impacts levels of sensing, seizing and transforming within the team. A focus on min–max scores could prove valuable when looking at whether the CEO has an impact on TMT dynamics and whether this is driven by the min–max scores of the CEO and the min–max scores within the team. In support of this type of team composition operationalisation, Steiner (1972) found that the personality profile of the lowest ability members within a team had an impact on quality and that this measure could be used to examine and relate the lowest trait scores to measurements of performance. While min–max measurements offer a way of looking at the lowest and highest personality traits within the team, it is a less used method as a result of its failure truly to represent the team construct at the collective level.

The final method to operationalise team composition focuses upon the variance in traits across individual members within a team. Using standard deviation, it is possible to capture the spread of personality characteristics within the team in order to capture diversity and variability. This in turn explores how individual characteristics vary from the team mean and can be used to overcome the areas that mean-level interpretations alone may mask. By focusing on standard deviation measurements, it is possible to understand the relationship between personality trait homogeneity and dynamic capabilities at the team level. The measurement allows for insight into how the variety of personality characteristics within the team allows for greater levels of sensing, seizing and transforming. This would address the question of whether we need teams with a range of personality traits or whether a high concentration of particular traits is more related to dynamic capabilities. This, however, is something that offers a deeper level of analysis, which could perhaps be used once the initial relationship has been identified and interpreted.

Each of the three operationalisations discussed above focus on a different aspect of team composition and therefore asks a different question of the data. The appropriateness of any of the three is dependent upon the nature of the research and subsequently the research questions asked (Bell, 2007), with a

central aim of exploring initially whether or not there is a relationship between personality and the cognitive processes of sensing, seizing and transforming. Operationalising team composition using mean scores allows for an exploration of the relationship between personality traits at the collective level and the cognitive processes reported by the top management team. Allowing for an initial examination of the relationship between personality and dynamic capabilities to be undertaken, it is possible to see whether a relationship exists between the two in the first instance. The inputs in the form of an individual's personality are therefore considered to combine together into a collective output, which is then measured in relation to the cognitive processes self-reported at the team level. Using this method of interpretation, it is possible to understand whether particular traits are related to higher levels of sensing, seizing or transforming within the firm. Mean score operationalisations are thus deemed to be appropriate as the dominant method of operationalising trait characteristics within this study. This is supported by a number of empirical studies where mean scores have been used successfully to aggregate individual-level personality and to draw conclusions with team-level outcomes, including team effectiveness, job satisfaction and product development, for example, Acuña et al. (2015), Mohammed and Angell (2004), Ployhart, Weekley and Baughman (2006) and Reily, Lynn and Aronson, 2002).

Relating back to the existing work on dynamic capabilities, it is possible to support mean-level interpretations with the conceptual underpinnings that dynamic capabilities traditionally conceptualised at firm level can be viewed at individual and team levels by harnessing the cognitive capacities of individuals and teams to support the intuitive process of dynamic capability development (Hodgkinson & Healey, 2011). Relationships between certain personality traits and the cognitive processes of sensing, seizing and transforming would therefore be expected to be seen and captured using mean-level data.

While the main form of operationalising team composition is the use of mean scores, there are instances where standard deviation has been used. Standard deviation is used at times to complement mean scores by adding in the dimension of variance and thus diversity. In particular, when exploring the self-

reports of sensing, seizing and transforming, standard deviation is used to understand the homogeneity seen across individual responses within the team. This measure is thus used to understand the extent to which individuals have been able to paint a coherent picture of the three processes within the team. This, in turn, paves the way for a detailed exploration of how personality and dynamic capabilities may be related. This research posits that this as an interesting area for investigation.

2.7 Personality and dynamic capabilities: a platform for further exploration

In the field of strategic management, and specifically the study of the upper echelons (Hambrick & Mason, 1984) the impact of managers on wider strategic practice has long been discussed stemming from the foundations of work developed by Barnard (1938). Recently, discussions of the resource-based view of the firm have highlighted the need to consider the skills base which exists at the top of the firm (Martian, 2011). This focus on the top management team supports work showing the differences CEOs and their TMTs have on performance elsewhere in the firm, deemed the CEO effect (Weiner, 1978). The CEO effect has been the subject of much academic discussion including notably within the work of Hambrick and Quigley (2014) who show using a 20-year sample of CEOs that CEOs have a substantial effect on firm performance. This supports the thinking of theorists including Child (1972) and Rumelt (2011) who argue that those in executive positions have the ability to 'substantially shape the fates of enterprises' (p. 473). While some attribute this influence to the personality and individual makeup of the CEO and his/her TMT, others identify the conditions which may influence executives to have varying levels of influence over organisational outcomes (Shen & Cho, 2005).

The very study of management rests, in part on the premise that managers vary in their effectiveness in ways which have ultimate consequences for the organisation they exist within. This in turn presents a driving force for research which focuses upon top management teams with the premise being that they matter. This is a premise which some consider to be heightened and more pronounced when one elite group in particular are studied; CEOs. Following

axiomatically from the hierarchical structure within firms, CEOs have an influence which is able to influence not just the TMT but subunits elsewhere in the firm. This has led some theorists including Porter (1980) to show how through the actions of those in power it is possible to create value within the organisation. As highlighted in the work of Hambrick and Quigley (2014, p. 475) 'considering their combined roles in strategy formulation, strategy implementation, and leadership, there would seem to be ample scope for CEOs to place their marks on their organisations – for good and for ill'. To understand this further requires a study of behaviour, and, in this case, the study of one such determinant; individual personality.

At the same time, despite it being widely accepted that CEOs and their TMTs have strategic power and influence, it is also widely discussed that they face limits. For example, they are constrained by preexisting resource and asset configurations within the firm (Fondas & Wiersema, 1997), culture (Hannan & Freeman, 1977) and institutional policies to name but a few. Aside from external constraints, those at the top of the firm may also face constraints from dominant family members (Morris et al, 1997), predecessors on the board and their own psychology of inertia. This psychology of inertia provides an interesting arena for exploration and one, which fits well when discussing the theoretical link between personality and dynamic managerial capabilities as presented in figure one. If a CEO or TMT member is 'bound up by their own psychology of inertia' this could result in that individual lacking imagination/boldness to seize a business opportunity, or revert back to the status quo due to contentment/lack of risk taking e.g. Carpenter and Golden (1997; Hambrick, Geletkanycz & Fredrickson, 1993).

In raising the issue of the psychology of inertia, an inherent tension exists. On the one hand, there is a large potential for CEOs to influence strategic practice, yet the presence of constraint exists. This has led researchers to examine just how much influence CEOs have on firm performance. In doing so, studies such as Lieberman and O'Connor (1972) have aimed to separate contextual influence from the CEO effect to draw conclusions on performance with positive outcomes resulting. If we therefore reflect upon what we know about the effect of

CEOs/TMTs on firm performance then, we can position the need to explore the personality of said individuals. This line of inquiry allows for relationships to be drawn between personality and dynamic capabilities in line with thinking on the CEO effect. This allows for the psychology inertia to be linked in some way to dynamic managerial capabilities e.g. does the personality of an individual have an impact on sensing, seizing and transforming?

While the relationship between personality and dynamic capabilities is a novel aspect of this study, personality has previously been linked to a number of strategic management practices/outcomes supporting the need to study personality in the workplace. Barrick et al (1998) for example conducted a study with 652 employees composing of 51 work teams in order to study the relationship between team composition (personality), team process (social cohesion) and team outcomes (team performance). Barrick et al (1998) were able to show that teams higher in conscientiousness, agreeableness, extraversion and emotional stability received higher ratings for team performance and team viability. This study highlights the way in which personality, studied at an individual level, can be translated to a team level outcomes. In this manner, the results of Barrick et al (1998) paved the way for a greater exploration as to how the personality of one individual could, in essence, impact the actions or behaviour of others. This for example, was extended in the work of Neuman, Wagner and Christiansen (1999) where two distinct personality traits were examined at the team level. With a sample of 328 retail assistants working across 82 teams, the authors were able to predict team job performance using personality. For example, the traits of conscientiousness, agreeableness and openness to experience were shown to predict team performance. Personality composition across team research has thus provided fruitful opportunity to explore the impact of personality traits on wider outcomes within the team and the firm (Neuman, Wagner & Christiansen, 1999).

In a meta-analytic review by Zhao, Seibert and Lumpkin (2010) attention was directed towards the relationship of personality to entrepreneurial intentions. With an overarching message that personality plays a role in the emergence and

subsequent success of entrepreneurs, Zhao, Seibert and Lumpkin (2010) highlight the need to consider personality and in particular four of the five big five traits with shown to influence entrepreneurial intention. Interestingly, agreeableness was not associated with entrepreneurial intention and this links to later hypothesis development in this research where agreeableness was predicted to be negatively associated with sensing and seizing.

The study of personality within the dynamic capabilities arena can be linked to the entrepreneurship literature due to the similarities which exist between dynamic capabilities and entrepreneurial thinking. For example, any interpretations of sensing, seizing and transforming can be linked to some kind of entrepreneurial spirit where there is a need to continually look for opportunities, seize such opportunities and develop the resource base for survival. Interest in the role of personality in entrepreneurship has recently, as argued by Zhao, Seibert and Lumpkin (2010) seen a revival and a re-emergence in interest (Baum, Locke & Smith, 2001; Ciavarella, Buchholtz, Riordan, Gatewood & Stokes, 2004). This revival has been fuelled by researcher's turning to theoretical hypotheses in order to link personality and entrepreneurship in a way which moves away from inconsistent previous findings. The meta-analysis such as that provided by Zhao, Seibert and Lumpkin (2010) thus provides an opportunity to present a comprehensive analysis of the five-factor model of personality and entrepreneurial status. This therefore builds on previous research which has shown the big five personality dimensions to be related to job performance (Barrick & Mount, 1991). Extending this logic to entrepreneurial thought and dynamic managerial capabilities, it is expected that people who score higher on personality traits related to entrepreneurial behaviour will have higher self-reports of sensing, seizing and transforming. The task behaviour of the CEO/TMT is considered to be critical due to the important strategic influence they have elsewhere in the firm. For example, Baum and Locke (2004) highlight the effect personality traits have on new venture performance through aspects such as motivation, goals and communication.

In sum, considerable theory and empirical research suggests that personality constructs should be viewed as an important and critical determinant of

entrepreneurial individuals. This can then be extended to the study of dynamic managerial capabilities where personality dimensions can be linked to behaviours thought to be involved in the creation and sustaining of dynamic capabilities.

The upper echelons and CEO psychology literatures suggest that the psychological attributes of CEOs have an influence on the strategic choices they make through what Nadkarni and Herrmann (2010, p. 1052) position as a three stage 'filtering process'. This filtering process includes defining a field of vision, perception and then interpretation, something, which can be closely linked to the three processes of sensing, seizing and transforming defined in this research.

Nadkarni and Herrmann (2010) state that the psychological attributes of an individual determine how intensely a CEO searches for information (sensing), how much information they scan and the sources they use to support this (seizing) and how they learn and continually improve (transforming). These activities define what can be referred to as the CEOs field of vision which serves as somewhat of a filter between an objective situation, perhaps something within the macro environment and the subjective reality of a situation which is construed by the CEO. It is in this interpretation of the subjective reality of a situation where the psychological attributes become of particular importance.

Existing research suggests that some CEOs have an 'internal locus of control' which influences the field of vision which they have. Finkelstein and Hambrick (1996) for example propose that CEOs who have an internal locus of control will spend more time and effort seeking external sources to influence the extent to which they are able to make an informed decision compared to a CEO with more of an external locus of control. Nadkarni and Narayanan (2007) propose that the broadness of a field of vision fosters strategic flexibility which in turn enables a firm to change its competitive position. Johnson et al (2003) also refer to this field of vision and argue that it improves the sensing capability, central to dynamic capabilities development. Related to work on personality, the 'internal locus of control' highlighted by Finkelstein and Hambrick (1996) is linked to emotional stability by Judge and Bono (2001), which is used as a predictor of job performance.

It is possible to theorise links between personality and the enactment of dynamic managerial capabilities. Relating back to the activities of sensing, seizing and transforming, the cognitive expression of personality traits is what is important here. By examining personality and its cognitive expression in the enactment of dynamic capabilities, it is possible to test whether the personality of the CEO and TMT can be used to predict the dynamic managerial capabilities of sensing, seizing and transforming. Each of the traits captured and measured using the FFM is now explored in relation to sensing, seizing and transforming.

Conscientiousness. Conscientiousness reflects characteristics such as purposefulness and determination. A conscientious individual is someone who is strong-willed in nature. High levels of conscientiousness are associated with achievement, but can also be attributed to more negative connotations such as compulsiveness (Costa & McCrae, 1992). Reflecting upon the relationship between conscientiousness and dynamic capabilities, Peterson et al. (2003) note how high levels of conscientiousness reflect dependability and thus a dislike of deviating from past experiences. Conscientiousness could therefore be related to lower levels of seizing, with the team referring back to the status quo where possible. Johnson et al. (2003) argue that individuals with high levels of conscientiousness may have a narrowed field of vision for strategic decision-making, which could inhibit the ability to enact dynamic capabilities.

Because of a concern for others and the environment they exist within conscientiousness CEOs are likely to strongly rely on tried and tested strategies within the firm. However, this reliance on tried and tested strategies, over time, may reduce the extent to which there is opportunity for new, unique strategies to be developed. Bogner and Barr (2000) and Kiesler and Sproull (1982) argue that conscientious CEOs have a narrower field of vision which thus increases the selective perception of that individual. Linking this to dynamic capabilities, it can be hypothesised that conscientiousness may be a barrier to the process of sensing. When CEOs fail to see important opportunities that do fit their existing vision, they will be unable to respond in a way which promotes the seizing and

transformation of an opportunity. This is underpinned by the thinking of Nadkarni and Narayanan (2007) who position conscientiousness as inhibiting strategic flexibility.

Achievement striving, a facet of conscientiousness, results in individuals wanted to take control and assume responsibility. A high achievement striving CEO, as seen in the work of Miller and Toulouse (1986) is someone who likes to hold onto power and does so through the close monitoring of those around them. This close control is likely to reduce the creative freedom of individuals elsewhere in the TMT. It can therefore be theorized that a CEO high in achievement striving would be leading a TMT who feel unable to freely and openly share information to push the firm in new directions.

Conscientiousness individuals have a strong need to reduce uncertainty and this may be linked to their strong selective perception thus reducing flexibility (Judge et al, 2002). Conscientiousness CEOs may therefore inherently choose to work with those who are similar to themselves which could be positioned as reducing the creativity and overall flexibility of the TMT. Existing evidence from organisational behaviour literature, notably the work of Lepine, Colquitt and Erez (2001) supports the theorizing of a negative relationship between conscientiousness and the ability to adapt to changing contexts. Linking this to dynamic capabilities, it is theorized that conscientiousness will negatively be related to seizing and transforming.

Hypothesis 1: CEO/TMT conscientiousness is negatively related to reported levels of sensing, seizing and transforming within the TMT.

Hypothesis 2: CEO's high in Achievement Striving is negatively related to reported levels of sensing within the TMT.

Agreeableness. The relationship between agreeableness and the ability of a leader to bring about change has been widely discussed across organisational psychology and change management literatures. The relationship between the two however is somewhat ambiguous due to opposing mechanisms present

within discussions. On the one hand, Judge and Bono (2000) showed that agreeableness was a mechanism of trust-based relationships which in turn fosters a culture of creativity and co-operation. This open culture can be positioned as being positive for dynamic capability creation due to sensing, seizing and transforming all requiring open communication and an openness to both internal and external information sources. However, on the other hand, excessive agreeableness can result in leaders acting in a modest way due to focusing upon what employees think of them as opposed to doing what is best for the company and its strategic direction (Bono & Judge, 2004; Colbert, Judge, Choi & Wang, 2012). This in turn can be linked to flexibility, adaptability and processes of transforming being inhibited. Thus while average agreeableness can be positioned as allowing leaders to balance these opposing positions, high agreeableness may reduce the extent to which dynamic capabilities are self-reported. Low levels of agreeableness also have to be considered.

Hypothesis: CEO/TMT agreeableness is negatively related to reported levels of sensing and seizing within the TMT (informed by the work of Zhao, Seibert & Lumpkin, 2010).

Agreeableness is a dimension of 'interpersonal tendencies' and reflects characteristics such as trust, compliance and modesty (Costa & McCrae, 1992). Agreeableness is a trait that has triggered mixed empirical outcomes. For example, while Judge and Bono (2000) consider agreeableness to foster a culture of creativity through the facets of altruism and compliance, Langan-Fox, Cooper and Klimoski (2007) show that agreeableness has the potential to limit adaptability through passiveness. Average levels of agreeableness are thus most widely considered to be the optimum preference, allowing for each of the characteristics of agreeableness to be somewhat balanced. Interestingly here, CEOs with low levels of agreeableness have been shown to promote competition and fear in the workplace, which would in turn restrict the development of dynamic capabilities.

The relationship between agreeableness and the ability of a leader to bring about change has been widely discussed across organisational psychology and change management literatures. The relationship between the two however is somewhat ambiguous due to opposing mechanisms present within discussions. On the one hand, Judge and Bono (2000) showed that agreeableness was a mechanism of trust-based relationships which in turn fosters a culture of creativity and co-operation. This open culture can be positioned as being positive for dynamic capability creation due to sensing, seizing and transforming all requiring open communication and an openness to both internal and external information sources. However, on the other hand, excessive agreeableness can result in leaders acting in a modest way due to focusing upon what employees think of them as opposed to doing what is best for the company and its strategic direction (Bono & Judge, 2004; Colbert, Judge, Choi & Wang, 2012). This in turn can be linked to flexibility, adaptability and processes of transforming being inhibited. Thus while average agreeableness can be positioned as allowing leaders to balance these opposing positions, high agreeableness may reduce the extent to which dynamic capabilities are self-reported. Low levels of agreeableness also have to be considered.

Extraversion. Extraversion is a trait associated with sociable individuals and comprises characteristics such as assertiveness, warmth and excitement-seeking (Costa & McCrae, 1992). Extroverted CEOs are considered to stimulate discussion and encourage social exchanges. This is therefore a trait that could be linked to sensing, as sensing requires individuals who are willing to gain knowledge from a range of perspectives (Teece, 2009). Extroverted leaders are also considered by Bono and Judge (2004) to be able to persuade and influence others. The level of this trait within the CEO is therefore an important area of research in determining whether the CEO is able to influence the enactment of dynamic capabilities within his or her TMT.

Extraverted leaders are those who enjoy social engagement and often start and encourage social interactions (House and Howell, 1992). The extent to which a leader is extravert thus influences the networks they have and how they use these networks to receive and then disseminate information, something, which directly aligns to the collection and dissemination of information across the processes of sensing and seizing. McDonald, Khanna and Westphal (2008: 453) suggest that leaders who develop 'advice networks' are exposed to more novel points of views and alternative perspectives which facilitate their ability to deal with strategic challenges. Broad networks and social networks can be theorised as supporting dynamic capability creation. Extraversion has been linked in the literature to strategic flexibility by Hitt et al (1998) and Shimizu and Hitt (2004). Extraverted individuals have strong social skills which can help to lower resistance within an organisation.

Hypothesis 3: CEO/TMT extraversion is positively related to reported levels of sensing, seizing and transforming within the TMT.

Hypothesis: CEO/TMT agreeableness is negatively related to reported levels of sensing and seizing within the TMT (informed by the work of Zhao, Seibert & Lumpkin, 2010).

Openness to experience reflects characteristics such as active imagination, aesthetic sensitivity and attentiveness to inner feelings (Costa & McCrae, 1992). Costa and McCrae (1988) argue that open individuals adapt to the perspectives of others and therefore it is possible to test whether decision-makers high in this trait actively seek new experiences (Judge et al., 2002). As seen in the work of Datta et al. (2003), CEOs with higher levels of openness to experience were considered central to promoting the need for adaptation in dynamic environments. It is therefore possible to test whether key decision-makers with high levels of openness to experience will self-report higher levels of sensing and seizing in an attempt to capture and draw on new experiences. Approached from a cognitive perspective, sensing is often aligned to the cognitive capabilities of perception and attention. Managers need to be able to scan opportunities and then seize them. The nature of these activities is therefore

considered to be influenced by the cognitive expression of personality within that individual, which is then heightened at the team level.

Openness to Experience. Individuals with a strong desire for new experiences are argued by Costa and McCrae (1988) to be highly adaptable. Further, as highlighted in the work of Judge et al (2002), leaders who are open to new experiences actively seek excitement and often this takes the form of risks. This is an important trait therefore and one, which can be linked to the process of seizing. This research theorizes that a positive relationship will exist between extraversion and seizing. The desire for risk taking may promote behaviours which develop the process of sensing to an actual grasping of the opportunity. This thinking is underpinned by the work of Datta et al (2003) who link CEO's openness to experience to strategic adaption within dynamic environments.

Open individuals in positions of authority within the firm are likely to interact well with new opportunities and be receptive to them. This in turn is likely to broaden the vision that they have and this could be used to create a strong approach to dynamism within the firm (Johnson et al, 2003). At the other end of the scale, low levels of openness to experience are likely to result in strong internal biases which restrict new experiences. A CEO for example low in openness to experience may avoid any strategic suggestions from his or her TMT which go against or deviate away from past strategies.

Hypothesis 4: CEO/TMT openness to experience will be positively related to reported levels of sensing and seizing within the TMT.

The final trait of neuroticism measured using the FFM is one often considered to be the most pervasive of traits measured, referring to the level of emotional stability in an individual. Neuroticism reflects characteristics including anxiety, depression and self-consciousness (Costa & McCrae, 1992). Neuroticism is considered to be a strong predictor of adaptability and ability to cope with change (Peterson et al., 1993). In particular, De Hoogh, Den Hartog and Koopman (2005) showed that within dynamic environments, emotional stability was a predictor of leader effectiveness. Lower levels of neuroticism may support

the enactment of dynamic capabilities. Furthermore, Shimizu and Hitt (2004) showed that emotionally stable CEOs were able to challenge the status quo, which in turn has positive implications for the ability of leaders to deal with dynamic environments.

Peterson et al (1993) consider neuroticism and the emotional stability of an individual to be a strong predictor of the extent to which that person is able to adapt to changing and unpredictable situations. The emergence of dynamic capabilities has stemmed from a rise of dynamism and thus this is a strait which requires consideration. Previous research suggests that neuroticism becomes more relevant in dynamic and changing environments. For example, De Hoogh, Den Hartog and Koopman (2005) found that emotional stability predicts leader effectiveness within dynamic environments but not in environments which were stable. This research theorises that lower levels of neuroticism will be positively related to dynamic capabilities. Individuals who have lower levels of neuroticism will be able to deal with the anxiety and stress surrounding dynamism and will be able to encourage others to act in an adaptable and flexible way as a response strategy. Rational thought here becomes an important consideration to aid interpretation of a situation. This is supported by the work of Johnson et al (2003) who argue that the lower a CEO is on neuroticism the more likely they are to improve their sensing capabilities. This research thus theorizes, supported by previous academic work, that neuroticism will be negatively associated with the process of sensing. Overall, it is expected that the higher the level of neuroticism in a CEO or TMT member, the lower the self-reported level of dynamic capabilities.

Hypothesis 5: Neuroticism will be negatively related to reports of of sensing within the TMT.

Reflecting upon the dominant role CEOs play in changing environments, in an important paper by Von den Driesch, Da Costa, Flatten and Brettel (2015) the authors examined the influence of the personality and experience of the CEO on the network of dynamic capabilities within the firm using a sample of 295 CEOs. This was the first paper since the emergence of dynamic capabilities to bring

personality into the equation. However, despite the availability of a number of measures of personality, Von den Driesch et al., (2015) chose to rely on core self-evaluation (CSE). CSE encompasses a stable personality trait and refers to four dimensions: locus of control, neuroticism, self-efficacy and self-esteem. It is a measure of personality which has been widely criticised due to it being considered to have low predictive power fuelled by its abstract nature thus weakening its empirical application. This is somewhat confirmed in the work of Von den Driesch et al.,(2015) who are unable to specifically relate personality to dynamic capabilities in any detailed way. By basing findings on the self-evaluation of personality, the authors move away from the more widely used self-report tools such as the FFM, designed to measure personality in a way which is less subjective than that employed by the CSE and thus does not allow for the identification or measurement of specific personality domains/facets. Positioned as an inherent weakness of the Von den Driesch et al., (2015) paper, despite arguing that personality will be used to understand dynamic capabilities, little is achieved from the empirical study and this is evidenced in their analyses section where little can be drawn from what personality means and how it relates to dynamic capabilities with more emphasis being placed on the experience and demographics of the CEO. What the paper is however able to do is to promote the value of looking at individuals within the firm and a number of interesting findings did stem from the study including CEO tenure being positively related to capability development and that while age and experience initially have a positive effect on capability development and change within the firm, this reduces when the CEO reaches their peak, considered by Von den Driesch et al.,(2015) to be between 41-45. This raises the ambivalent effect that needs to be considered where age is concerned.

In the current study by measuring the personality traits of the CEO and his/her TMT in a specific manner, it is possible to test whether personality is an important micro-foundation of dynamic capabilities. As a previously unexplored research area, this opens up the opportunity to understand dynamic capabilities better, which in turn could contribute to an existing and growing body of research exploring the micro-foundations of dynamic capabilities. To explore dynamic capabilities further within the firm, learning is used to see how dynamic

managerial capabilities within the TMT influence behaviour elsewhere in the firm. This, in turn, raises the importance of organisational learning and dynamic capabilities as a final research theme.

2.8 The Key Debates

Despite the vast amount of literature on the subject of dynamic capabilities, the dynamic capabilities approach has sustained criticism across a number of areas as a result of findings being considered diverse and unconnected (Wang & Ahmed, 2007; Barreto, 2010), with some outstanding definitional issues (Barreto, 2010). Zahra et al. (2006, p. 921) refer to the dynamic capabilities literature as 'implicitly tautological'. The same criticism has traditionally been directed towards the resource-based view of the firm, on which dynamic capabilities frameworks are built. More recently, however, Peteraf et al. (2013) argued that the issue of tautology has been resolved, driven by a more specific exploration of new ideas related to the study of the micro-foundations of dynamic capabilities.

Barreto (2010) built a critical assessment of dynamic capabilities research by examining those papers published between 1997 and 2008. He identified 37 key papers that he felt contributed to the development of the field. Barreto thus took a different approach to that employed in the analysis provided by Di Stefano et al., which analysed instead the intellectual foundations of the field. In his paper, Barreto identifies 40 per cent of the key papers as conceptual and 51 per cent as empirical studies that make a contribution. Those studies empirically examining dynamic capabilities were focused upon performance (26%), characteristics (37%), sources (26%) and, much less so, the role that management plays (11%).

In a more recent analysis, Vogel and Cuttel (2013) examined literature published between 1994 and 2011 using bibliometric models. Vogel and Cuttel (2013, p. 426) stated that 'the core cluster of the current dynamic capabilities

literature, which visualises this research field's nascent but fragile identity, focuses on learning and change capabilities and relates them to firm performance, thus merging aspects of organisation theory and strategic management'. Both Barreto (2010) and Vogel and Cuttel (2013) offer a critical examination of the field, using this to develop future areas of research necessary to move the field forward.

The central criticism of dynamic capabilities research, as evidenced in this review, is the issue that much of the work completed remains at the conceptual level. This was a claim first made by Helfat et al. (2010), who argued that this conceptual focus was holding the field back. More than a decade on, the observation made by Kraatz and Zajac (2001) remains relevant 'While the concept of dynamic capabilities is appealing, it is a rather vague and elusive one which has thus far proven largely resistant to observation and measurement' (p.651).

Other than at the conceptual level, little focus from within the field has demonstrated at an empirical level how dynamic capabilities operate and how they contribute to firm performance, if at all. Related to the rapid growth of dynamic capabilities over a short period of time, a diverse body of research has resulted, which Barreto (2010) says 'shows the dynamism generated by the topic and is justified by the youth of its approach' (p. 251). He goes on to say that, along with other commenters on dynamic capabilities, including De Stefano et al. (2010), there is a need to encourage competing areas to move towards consolidation across ideas in order to progress the field forward. This focus and consolidation, and the criticism directed at the field, are referred to in the work of Helfat and Winter (2011), who state that 'despite more than a decade of strategic management research on dynamic capabilities, important conceptual issues remain' (p. 1247).

With the first empirical study on dynamic capabilities published in 2001, the field still lacks a strong empirical grounding, which is evidenced by the lack of measurement tools. This lack of empirical grounding is fuelled by the empirical

challenges that exist, which can be considered to be somewhat substantial in nature and driven by the field's inherent view of highlighting the black box nature of prominent constructs (Arend & Bromiley, 2009).

As evidenced in this review, various definitions of dynamic capabilities exist and debate surrounds whether dynamic capabilities are routines or abilities (Zollo & Winter, 2003; Teece et al., 1997; Zahra et al., 2006). Positioning dynamic capabilities as abilities, this research places emphasis on the importance of micro-foundations and viewing dynamic capabilities as abilities that the firm can build upon and develop within its TMT. Routines are commonly positioned as not being purposeful in nature, and yet a focus on activities is purposeful and reflects change. Variations in opinion here relate strongly to the variations that exist among academics in the dynamic capabilities community.

2.9 Theoretical underpinnings of this research

As a result of the literature review, this study has provided the conceptual basis that the personality of the CEO or his/her TMT members could be an important micro-foundation of dynamic capabilities. Teece (2007) provided a micro-foundations framework for dynamic capabilities, which is used to shape the empirical examination of the relationships between the cognitive capabilities of sensing, seizing and transforming at the individual and team levels and, in turn, relates this to personality within this study. As discussed, learning can be conceptualised as both an antecedent and a dynamic capability. This research positions it as a dynamic capability because of its embedded nature and the extent to which learning reconfigures existing resources. By positioning learning as a dynamic capability it paves the way for this research to explore the links between one specific dynamic capability and firm performance, as well as its links with micro-level dynamic managerial capabilities. This study therefore adopts a position that seeks to bring organisational psychology and strategic management thinking together to promote the importance of looking at individual differences, notably personality, to predict macro phenomena within the firm.

Although as a field considerable steps have been taken to advance the conceptual discussions of dynamic capabilities presented by authors such as Teece (2009), Zollo and Winter (2002) and Zott (2003), this work conceptualises and measures capabilities only at the macro level, resulting in the idea that capabilities are unobservable. Black box constructs have resulted in criticism being directed at the field because of its inherent vagueness. Therefore, this tells only one side of the story. While substantial moves have been made to conceptualise the micro-foundations of dynamic capabilities, to date, no studies have explored how one core individual difference – personality – has a role here. Research at the micro level is important, as it can help to shed light on the important macro phenomena. This study has therefore identified the need to develop a measurement tool capable of empirically studying dynamic capabilities at the micro level responding to the lack of empirical grounding and measurement within the field.

Contributing to the conceptual thread presented in this chapter provided by work including that of Eisenhardt and Martin (2000), Helfat and Peteraf (2003), Zollo and Winter (2002) and Zott (2003), initial understandings have been gained regarding the different inputs of dynamic capabilities. However, despite this conceptual thinking, to date there is little work in existence allowing for capabilities at the micro level to be measured. From this point, this study aims to investigate the micro-foundations of dynamic capabilities within the TMT by getting TMTs inadvertently to self-report dynamic managerial capabilities, which offers empirical evidence showing how differences in personality result in differences captured in dynamic managerial capabilities. This study plans to conduct a multi-level research project where attention is directed towards the micro-foundations of dynamic capabilities, one specific dynamic capability in the form of learning and firm performance. This study therefore contributes to a number of current discussions within the field, including the importance of individual differences, micro–macro linkages and the extent to which dynamic capabilities result in superior performance.

Moving away from general interpretations of dynamic capabilities, this study is placed within the context of two industries: finance and high technology. It promotes the idea that context is fundamental to dynamic capabilities and marks the importance of studying dynamic capabilities within a specific context to shed light on understanding. Zahra et al. (2006) commented on the 'dearth of studies specifically in SMEs and entrepreneurial firms'. This thinking was further reiterated by Pitelis and Teece (2009) and Teece (2007; 2012). The firms focused upon in this research are SMEs with fewer than 250 employees, which directly relates to the call for a greater number of studies to be directed towards SMEs, new ventures and entrepreneurial spirit.

2.10 Chapter Summary

Despite being a relatively new topic in the wider field of strategic management, dynamic capabilities is considered to be a concept that demands empirical and theoretical treatment and is thus an area that has demanded significant attention in recent years. The study of micro-foundations, in particular, has gained attention, driven by a desire to shed light on dynamic capabilities by looking at the psychological and behavioural dimensions tied up within them. The study of individuals and teams within the firm is thus widely promoted and this research responds directly to the call of Teece (2012) for research in this area. Despite the dynamic capabilities literature gaining popularity and momentum, as revealed within this literature review, questions still exist; in particular, there is a need to

Chapter 3

Research Methodology

This chapter explains the justification for adopting a quantitative approach to the methodology for this study. Examining the positivist research paradigm, this chapter discusses the research instruments chosen to explore the relationships between the personality of the CEO/TMT and dynamic managerial capabilities, dynamic managerial capabilities and learning, and the relationship of both with the firm's tangible performance. Furthermore, the procedures for identifying the research sample are examined, followed by a discussion of each of the six research phases, with particular attention directed towards the research instruments used and the initial steps taken to analyse the data.

The literature review conducted in previous chapters critically examined the major literature associated with this research. In particular, a focus was applied to trait theory, the resource-based view of the firm, and the micro/macro nature of dynamic capabilities. This research is specifically concerned with the individual and team cognitive processes, which lead to the development of dynamic managerial capabilities within the TMT.

As reflected within the literature review, because dynamic capabilities research is a relatively new area of theoretical focus within strategic management, little empirical support exists for many of the constructs considered within this research. A starting point was therefore to gain clarification on a number of 'black box' constructs. To date, little empirical work has been attempted to tie together dynamic capabilities and personality, and thus the research objectives pursued here have emerged through key theoretical and practical gaps in understanding.

3.1 Quantitative Methodology and the Positivism Research Paradigm

Research is grounded in philosophical perspectives. As a researcher it is important to consider and appreciate various philosophical positions in order to clarify the appropriate research designs, as well as the nature and focus of the study (Benton & Craib, 2010). The philosophical position adopted can therefore be seen to influence significantly the questions the research asks and the way it approaches answering these questions. While a variety of philosophies exist, including positivism, rationalism, empiricism and interpretivism, within social research two major research paradigms are seen to dominate: positivism and interpretivism (Goulding, 2002). A paradigm mirrors what is essential and legitimate for research and thus offers a coherent view of the world, which ultimately guides the decisions the researchers make (Smith, 2004; Rao & Perry, 2007). Positivism and interpretivism are discussed in this chapter as two central paradigms, which can be used to examine the reality of a situation.

In the positivist paradigm, the object of study is considered to be independent of the researchers examining it and research is approached in a deductive manner (Easterby-Smith, Thorpe & Jackson, 2012). Knowledge is considered to be discovered and verified through observations and measurements of particular phenomena. Facts are established by measuring different elements of a phenomenon to reveal its individual component parts (Krauss, 2005). Within the positivist research paradigm, quantitative data is used to uncover and measure patterns of behaviour. Research is therefore approached in both a detached and objective manner. Appreciating that different research paradigms result in different methodologies, there is a need to understand how the research paradigm of interpretivism differs to that of positivism. The second research paradigm, interpretivism, challenges positivism through the notion that in order to understand the meaning emerging from the research process, there is a need to move away from statistics and to focus instead upon interpretation gained through interactions between the researcher and the social world. Focused upon context and situation, the interpretivist research paradigm examines the meaning of data and the interpretation of such. Although interpretivism offers the potential for a more enriched understanding of the data it can be difficult to generalise findings. Qualitative data aligned to interpretivism can therefore be

considered somewhat restrictive and context-bound (Biedenbach & Muller, 2011).

As a result of dynamic capabilities being a construct, which is commonly depicted as being difficult to measure, a positivist approach allows for objective and thus repeatable measures to be put in place, which in itself tackles an area that is currently lacking within the field. Rather than understanding what is happening through the adoption of a qualitative methodology, this research supports looking for causality and fundamental relationships in order to explore whether a relationship between personality and the potential for dynamic capability creation can be determined. Positivism and the use of scales were deemed to be the most appropriate tools.

Furthermore, since the concepts being explored do not lend themselves to existing measures within the literature, there was a need to adopt an empirically driven coherent theory of how to measure dynamic capabilities that was specifically related to the design of measures within a questionnaire. Had existing measures been in place it may have been valuable to employ more of a qualitative, interpretivist perspective, but this was not suited to the purpose of the research to explore whether a relationship exists between personality and dynamic capability creation.

The research instrument adopted within this research facilitates the collection of quantitative data through the use of online questionnaires. A positivist paradigm is adopted where a given phenomenon is considered to be isolated and thus able to be measured. This is supported by a central contribution of this research being its proposal of a measurement tool, which measures sensing, seizing and transforming at team level. Importantly, according to positivists it is possible to repeat observations through the use of developed measures, which in essence reduces a given phenomenon to the simplest elements. Within this research, a traditional 'black box' concept such as dynamic capabilities is taken and a series of measures are applied to develop appropriate proxies and measurements, as discussed in more detail below. As such, the very concepts explored within this

research have been operationalised so they can be measured effectively, which supports a positivist way of thinking. Furthermore, dynamic capabilities are considered to have cause and effect, allowing relationships to be examined. Rather than understanding what is happening through the adoption of a qualitative methodology, this research supports looking for correlational effects, and thus relationships, in order to explore the relationship between the personality of key decision-makers and dynamic capabilities across the firm. The firm in this study is considered to be an inherently multi-level, dynamic area of study and, as such, requires a research instrument that is able to capture different dimensions and dynamics.

Research in the field of strategic management has typically been considered to be steeped in positivism and quantitative methods. Strategic management places emphasis on the importance of quantitative research instruments and measurable outcomes. This is something that is also seen in psychology research and the study of personality (Costa & McCrae, 1995; Judge & Bono, 2000). The ability to measure something and report conclusive outcomes is thus well received across both fields. Quantitative research underpinned by positivist thought also seeks to move away from the vagueness and ambiguity currently associated with dynamic capabilities, with Schilke (2014) referring to the 'ill defined boundary conditions and the confounding discussions of the effects of dynamic capabilities' currently taking place within the field (p. 179).

3.2 Research Design

The main preoccupations of quantitative research lie with the development of measures, constructs and relationships. On an application level, quantitative research is most commonly associated with survey/questionnaire design. Each technique within the quantitative approach has its own strengths and limitations.

Since the main aim of this research is to explore the relationship between dynamic capabilities and the personality of CEOs/TMT members across multiple

firms and multiple levels, the use of questionnaires is considered to be an appropriate research instrument to achieve the aims of the study. One of the core strengths of using questionnaires is the ability to collect data from a number of firms, and thus a large number of research participants from different levels within the firm. Questionnaires allow for correlational effects to be examined and for the relationship between dynamic capabilities and personality to be explored in a statistical manner. While interviews would have potentially offered a deeper insight into the self-reports of dynamic capabilities, the main justification for not using the interviews arose from the nature of the main research participants involved in the study. CEOs and TMT members are widely considered to be a difficult sample group to capture and thus there was a need to avoid a lengthy research process. The decision to conduct all data collection online was driven by the need to make the data-collection process quick and straightforward for the research participants.

While the strengths of using questionnaires can easily be attributed to a number of benefits, including practicality and the ability to compare and contrast, it is important to consider the limitations of the chosen research tool. One of the main limitations associated with questionnaires is that people may interpret questions in different ways, and questionnaires can lack the detail associated with more qualitative research instruments, such as interviews (Bryman, 2015). In order to overcome the issue of missing data, questionnaires were designed online and one of the online features ensured that only completed questionnaires could be submitted.

The decision to conduct questionnaires online was driven by the nature of the population involved in the research. CEOs and TMT members are generally short of time and therefore there was a need to deliver the research instrument in an efficient manner. Conducting questionnaires online therefore allowed the researcher to achieve cost savings and, most importantly, to offer the sample population the flexibility they required whereby they could complete the questionnaires in their own time. A further benefit of conducting questionnaires online related to data accuracy, where the automated data-processing features

allowed for human error to be minimised. This in turn also aided the data-analysis stage.

3.3 Research Sample and Data Gathering

For the purpose of clarification, the following definitions are presented prior to an outline of the six research phases used in the study:

Chief Executive Officer (CEO) – defined as the senior executive charged with overall strategy and responsible to the board of directors for business performance (Petersen, Smith, Martorana & Owens, 2003). For the purpose of this study, the CEO is separated from his or her TMT.

Top Management Team (TMT) – ‘the set of individuals responsible for setting firm direction’ (Cyert & March, 1963).

The Firm – for the purpose of this research defined as a firm with 50–250 employees present within the finance or high technology industries, which has undertaken a strategic alliance/acquisition in the last 2 years.

The study is a deductive study focusing upon finance and technology firms in the UK to examine the relationships between personality and dynamic managerial capabilities using theoretical hypotheses developed in chapter two. To capture the multi-level nature of the modern-day firm, the study included CEOs, TMT members and middle management employees. No age or gender restrictions were placed on the sample population but all TMT members had to have a minimum tenure of 18 months to be able to link this back to organisational performance over the same time period. Only complete TMTs were included in this study for this reason. Theoretical sampling was employed in order to capture data that was theoretically relevant to the core phenomenon present within the study. Theoretical sampling can be defined as:

Data gathering driven by concepts derived from the evolving theory based on the concept of making comparisons, whose purpose is to go to places,

people, events that will maximize opportunities to discover variations among concepts and to identify categories in terms of their properties and dimensions (Strauss & Corbin, 1998: 201).

Finance and technology firms were required for all stages of data collection. Thirty-two firms participated in total, with eighteen of these firms being from the finance industry and the remaining 16 from the technology industry. These industries face an environment that is characterised by what Deeds, DeCarolis and Coombs (2000: 212) refer to as 'incessantly changing technologies and intense global competition'. The ability to remain competitive in such industries is determined by the firm's ability to generate new products and services and thus to innovate. This ability to generate new products and services is thus considered to be dependent upon capabilities (Weerawardena & Mavondo, 2011; Lin, McDonough, Lin & Lin, 2013). These capabilities must be as dynamic as the environment in which they exist (Teece, 2007; 2009). The knowledge base across finance and technology industries is continually advancing and this provides an arena from which to explore the micro-foundations of dynamic capabilities. This decision is supported by the works of Wu (2007) and Gowen and Tallon (2005), both of whom use high technology firms as a platform from which to explore dynamic capabilities.

Firms included in the study had to have a minimum of 50 and a maximum of 250 employees. The size restriction was put in place in order to ensure that the firms involved in the study were not too large to capture the different levels within the firm realistically. In addition, firms also had to have undertaken an alliance or acquisition in the past two years [this was validated using the Thomson One database]. An alliance/acquisition strategy had to be clear within the study as a result of strategic alliances/acquisitions being strongly linked with learning within the firm. Hagedoorn and Duysters (2002), for example, highlight that in recent years strategic alliances have been used to support the innovative performance of organisations. This is reinforced by the work of Helfat and Winter (2011), Zott (2003) and Eisenhardt and Martin (2000), who all state that strategic alliances/acquisitions are an important characteristic of those firms illustrating dynamic capabilities.

The sample criteria of firms were heavily influenced by existing research. The selection criteria were employed in order to control for firm size dynamics and industry conditions. By limiting the study to two industries it was possible to gain an understanding of the two industries in detail. This understanding was necessary in order to have conversations with the CEOs and TMT members of such firms during the recruitment phase. In support of this a combination of theoretical and purposive sampling was used to collect the data. Data deemed to be theoretically relevant to the core phenomenon presented in the study was collected. Theoretical sampling refers to data, which is driven by concepts emerging from an evolving focus on theory. By aligning data to theoretical discussions it is possible to make comparisons by collecting data, which maximises the opportunities for interesting findings (Strauss & Corbin, 1998).

The Chief Executive Officer (CEO) of each organisation, and his or her associated complete TMT, took part in the study. Each member had to have a minimum tenure of 18 months within the TMT. As a result of studying complete TMT sets, members were made up of diverse age groups representing both genders across the sample population. CEO and TMT members were chosen, as it has been widely considered that leaders exert meaningful influence on the performance and strategic capabilities of the organisation (Peterson, Smith, Martorana & Owens, 2003). The interaction between the CEO and the TMT is considered to be an important one and this research therefore seeks to examine, among other core variables, the influence of the CEO's personality on both the personalities of TMT members and the cognitive capabilities of sensing, seizing and transforming at the TMT level. The CEO–TMT interface is explored in this research by separating the CEO from his or her TMT. This is in response to a number of studies, which fail to make a distinction between the CEO and the TMT, with emphasis being placed instead on the *dominant coalition* within the firm (Cyert & March, 1963). Across each of the 32 firms, data was also collected from employees in middle management positions. This data was collected to show the consistency of dynamic capability reporting from the CEO–TMT–middle management. The three sample groups and the data collected from these groups could then be used to examine relationships with

organisational performance in a way that represents the multi-level nature of the firm.

As discussed above, different sample groups were used for different parts of the study. Each of the 32 firms making up the sample resulted in data from the CEO, the TMT and representatives from middle management. The six phases of the overall research study are outlined in Table 4 (below) and explained in more detail in Sections 3.5–3.5.4.

Table 4: Research Phases

Pilot Study 1:	Q-sort with 52 participants from a range of sample populations: business school students, managers and TMT members.
Pilot Study 2:	Telephone discussions with 12 TMT members.
Phase 1:	213 TMT members completing a questionnaire to measure the self-reported cognitive capabilities of sensing, seizing and transforming within the TMT.
Phase 2:	32 CEOs and 213 TMT members completing personality questionnaires NEO PI-3 online over PariConnect.
Phase 3:	533 employees across the 32 firms from middle management level; 533 employees completed a self-report questionnaire measuring organisational learning within the firm.

Phase 4:	Secondary data collected on financial firm performance using the price-to-book ratio (aligned to minimum tenure within the TMT).
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3.4 Contact with Organisations: Recruitment Strategy

A number of firms meeting the selection criteria were compiled using the Thomson One database. The Thomson One database was used to collect the details of, in most instances, a contact within the firm in the form of an email or telephone number. A list of 400 firms in total was compiled. LinkedIn was used as a recruitment tool. An advert was placed within the relevant LinkedIn groups, which was used to attract the attention of potential participants [see appendix A]. One final recruitment strategy involved attending a number of the Institute of Directors' events. These events were used to make personal contacts and proved an important basis from which to discuss the research in an informal manner with a view to gathering interest among the required sample population. The warm contacts gained as part of networking events proved valuable with 14 of the 32 firms that came from networking. The remaining firms were contacted by email and telephone in order to work through the list of identified firms and gain participants; this form of recruitment, while successful, did take longer to establish a relationship. Various methods of recruitment were used in order to increase the response rate for this research during the data-collection period.

In total, 347 firms were contacted and 34 firms agreed to take part in the study, reflecting a response rate of 9.7 per cent. In the final study, data from only 32 firms was used as a result of failing to capture complete TMTs for two of the firms who had initially agreed to take part in the study. The final response rate was therefore 9.2 per cent. The first data was collected on 15 March 2014 and the final data was collected on 16 September 2014.

3.5 Research Phases

3.5.1 Phase 1: Dynamic Managerial Capability Questionnaire

Chapter Four is dedicated to the design of the questionnaire sent to CEOs/TMT members. The design of this research instrument was given particular attention as a result of this being a newly designed measure for the purpose of this research. To move towards an empirical examination of the micro-foundations of dynamic capabilities, a scale was designed to measure the activities of sensing, seizing and transforming within the TMT. The pilot studies involved in the design of Phase 1 are also presented in Chapter Four, which should be referred to for further detail.

3.5.2 Phase 2: Personality Questionnaires, the NEO PI-3.

To measure the personality of the CEOs and TMT members involved in the study, the NEO PI-3 was used. The NEO PI-3 is considered to be the gold standard instrument for the measurement of personality, allowing for the big five personality domains to be captured (neuroticism, extraversion, agreeableness, openness and conscientiousness). The NEO PI-3 offers a concise platform from which to measure the five major dimensions of personality and the important facets that define each domain [see Table 4]. The NEO PI-3 consists of 240 statements, which are answered on a 5-point scale [a sample of scale items is available in Appendix B]. In total, thirty areas of personality are measured, with each of the five domains having a further six facets measured within. Originally developed by Costa and McCrae (1992), the 240-item questionnaire is published by the American publisher PAR Inc. and is used as the sole research instrument for the measurement of personality in this study. The decision to administer the NEO personality questionnaires through the American publisher was a result of the high costs of online facilities offered by the UK publisher Hogrefe. By using the NEO PI-3 it was possible to explore personality quantitatively, allowing for statistical relationships to be examined between personality and other major variables in the study during the later data-analysis stage. In order to be able to conduct personality assessments, a

two-day training course with the UK publisher Hogrefe was successfully completed [see appendix C for a copy of certification achieved].

The NEO PI-3 was administered individually online and was contained within the PAR test system. By conducting the NEO PI-3 online it was possible to ensure that no missing responses could be submitted. If a respondent had missed any responses he or she would be asked to return to these at the end of the questionnaire prior to submission. The NEO PI-3 offers a number of validity checks, which help to ensure that respondents have completed the questionnaire in an accurate manner. The nature of these validity checks further supports the overall validity of this measure. At the end of the questionnaire, there are three items. Item A asks respondents if they feel they have answered the statements in an open and honest manner. Respondents who disagree may feel they have not been fully candid and this in turn would require further attention from the researcher. The final two validity checks ask respondents if they have marked their responses in the right place; this is, however, less important when administered online, as the online system is designed to ensure that missed responses cannot be submitted.

The NEO PI-3 scores are presented as t-scores ($m = 50$, $SD = 10$). The NEO PI-3 is based on a sample of 1,301 working people in the USA. How an individual rates on a particular personality domain is thus aligned to how they compared to an average member of the working population. A t-score of 60 for extraversion would reflect an individual that had a standard deviation of one above the mean score, which would in turn be interpreted as saying that the individual had a higher level of extraversion than 84 per cent of the population. The interpretation of the NEO PI-3 therefore requires a consideration of the person in relation to the average population. It is noted that the majority of participants will score near the average, which is related to the normal, bell-shaped distributions of the scale items used within the NEO PI-3.

The NEO PI-3 has high internal consistency, which supports the validity and reliability of the measure. Internal consistency coefficients for the NEO PI-3

range from .86 to .95 for domain scales and from .56 to .90 for facet scales (A copy of sample items for the NEO is available in the appendices).

The online publisher PAR Inc. provided an online platform from which to administer the personality questionnaires and to monitor responses. PariConnect, an online system provided by PAR through a researcher account, was also used to purchase individual personality assessments and administer personal development reports, promised to participants in response for completing the personality assessment. Personal development reports were sent within 14 days of the participant completing the assessment. The personal development report summarised the findings of the assessment and aided the participant in an interpretation of his or her own personality profile. A sample personal development report can be found in appendix D.

All identified participants were sent a personalised link to the NEO PI-3 to their work email address. Prior to this, all participants had been made aware of what to expect of the NEO PI-3. On average, participants took 5.4 days to return the questionnaire and in most instances a follow-up email was required. The average completion time of the NEO PI-3 was 27 minutes and in total 252 completed NEO PI-3s were returned. From the 32 complete TMTs, 245 NEO PI-3s were used.

Once personalised links were sent out to research participants, participants were able to complete the personality assessment in their own time and the researcher was notified immediately once the questionnaire had been completed. All personality profiles were stored on the PariConnect platform and individual personality profiles were assigned to participant IDs to protect anonymity and then placed in encrypted files. This was in support of the ethical procedure outlined by the University.

The NEO PI-3 measures personality at the domain and facet level and both levels were used in the statistical analysis presented in chapter six. Table 5 lists

the personality domains and supported facets measured in the NEO PI-3. For a detailed description of the individual domains, please refer to the literature review in Chapter Two.

In consideration of the NEO PI-3 measuring personality at both the broader domain level and the more detailed facet level, there is a need to refer to the issue of the bandwidth fidelity dilemma in psychometric testing (Cronbach & Gleser, 1965). The bandwidth fidelity can be explained as 'the assessment of gain or loss in analytical and predictive power from using broad-band versus narrow band personality assessments'. The FFM of which the NEO PI-3 is based upon, captures broad level traits which although praised for their applicability do lack the specific-variance associated with narrower capturing's of personality. This is supported by the work of Driskelly, Hogan, Salas and Hoskin (1994) who found that personality facets were better predictors of performance than the broader, global domains captured. An understanding of this issue of variance is necessary to appreciate the downfalls of using domain data only and thus the current study employs supplementary understanding gained by reviewing the personality facets of the sample population.

Table 5: NEO PI-3 Scale Items

Domain	Individual Facets
Neuroticism (N)	Anxiety Angry hostility Depression Self-consciousness Impulsiveness Vulnerability
Extraversion (E)	Warmth

	Gregariousness Assertiveness Activity Excitement-seeking Positive emotions
Openness to experience (O)	Fantasy Aesthetics Feelings Actions Ideas Values
Agreeableness (A)	Trust Straightforwardness Altruism Compliance Modesty Tender-mindedness
Conscientiousness (C)	Competence Order Dutifulness Achievement-striving Self-discipline Deliberation

3.5.3 Phase 3: Questionnaire Capturing Learning at the Middle Management Level

Working closely with the HR department within each firm, middle management responses were collected from across each of the 32 firms. This data was collected in order to support the multi-level nature of the research. It was important to gain middle management responses in order to be able to determine the extent to which self-reports of sensing, seizing and transforming from the CEO/TMT within the firm reflected how one specific aspect of dynamic capabilities was reported by the MML.

Phase 3 consisted of a questionnaire that focused upon measuring knowledge and learning within the firm. Learning is a fundamental dynamic capability as it enables the firm to develop a position where it can overcome strategic blind spots (Teece & Pisano, 1994). Considered to be a crucial ingredient to competitive success, the final questionnaire within the study sought to measure learning to then link learning and knowledge to the TMT's dynamic managerial capabilities of sensing, seizing and transforming, as well as CEO/TMT personality.

The questionnaire sent to the MML was administered using the online software Bristol Online Surveys (BOS). The questionnaire consisted of 24 statements, which were measured using a 7-point scale to ensure consistency across the MML-level questionnaire and the questionnaire capturing dynamic managerial capabilities at the CEO and TMT level.

In order to measure knowledge and learning within the firm, six different types of learning were measured with one final measure being used taking the mean from items 1-6 to provide a measure of overall learning. Using the learning capability scale developed by Jerez-Gomez Cespedes-Lorente and Valle-Cabrera (2005), four different areas of learning were measured: commitment to learning (five items), systems perspective of learning (three items), openness and

experimenting/innovation (four items), and knowledge transfer and integration (four items). The learning capability scale was used to capture learning within the firm and was a measurement tool stemming from a validation sample of 111 firms.

To explore learning further within the firm, two additional scales were used to fill in the remaining gaps, namely, the areas unexplored by the learning capability scale. The intra-organisational knowledge-sharing scale developed by Calantone, Cavusgil and Zhao (2002) was used to capture five individual items measuring learning stemming from the exchanges that take place between organisations. Part of a wider scale delineating four components of learning orientation (commitment to learning, shared vision, open-mindedness and intra-organisational knowledge-sharing), the five items related to intra-organisational knowledge-sharing were used.

Finally, the measurement of learning used a scale by Kale, Singh and Perlmutter (2000) to explore learning related to strategic alliances (three items). Part of a larger scale, this research used only those scale items related to learning. Kale, Singh and Perlmutter (2000) referred to 3 items of learning within a 23-item scale examining relational capital, conflict management and partner fit across strategic alliances. Items related to learning were taken from this scale, as these items were specifically designed to measure the theoretical construct of learning in strategic alliances. It was important to understand learning at this level as a result of all the firms in the study having carried out a strategic merger/alliance in the last two years. Please refer to Section 2.8 for more detail on the learning scales employed in this study.

Table 6 presents the scale measures for the questionnaire sent out to the MML. Table 5 thus reflects three different learning scales being bought together for the purpose of this study. Items from different scales were used in order to design a questionnaire that met the needs of the current study and, in turn, enabled learning related to dynamic capabilities to be captured within the firm.

Table 6: Questionnaire items to measure learning at the MML

<u>Scale</u>	Individual Items
<p>Organisational Learning</p> <p>Capability Scale (Jerez-Gomez, Céspedes-Lorente & Valle-Cabrera, (2005))</p>	<p>Commitment to Learning</p> <ol style="list-style-type: none"> 1. The TMT frequently involve their staff in important decision-making processes. 2. Employee learning is considered more of an expense than an investment. 3. The firm's management looks favourably on carrying out changes in any area to adapt to and/or keep ahead of new environmental situations. 4. The firm places emphasis on enhancing the learning capabilities of individual employees. 5. In this firm, innovative ideas that work are rewarded. <p>Systems perspective</p> <ol style="list-style-type: none"> 1. All employees have generalised knowledge regarding this firm's objectives. 2. All parts that make up this firm (departments, sections, work teams, and individuals) are well

	<p>aware of how they contribute to achieving the overall objectives.</p> <p>3. All parts that make up this firm are interconnected, working together in a coordinated fashion.</p> <p>Openness and experimenting/innovation.</p> <p>1. This firm promotes experimentation and innovation as a way of improving the work processes.</p> <p>2. This firm follows up what other firms in the sector are doing; adopting those practices and techniques it believes to be useful and interesting.</p> <p>3. Experiences and ideas provided by external sources (advisors, customers, training firms, etc.) are considered a useful instrument for this firm's learning.</p> <p>4. Part of this firm's culture is that employees can express their opinions and make suggestions regarding the procedures and methods in place for carrying out tasks.</p>
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	<p>Knowledge transfer and integration</p> <ol style="list-style-type: none"> 1. Errors and failures are always discussed and analysed in this firm, on all levels. 2. Employees have the chance to talk among themselves about new ideas, programs, and activities that might be of use to the firm. 3. In this firm, teamwork is not the usual way to work. 4. The firm has instruments (manuals, databases, files, organisational routines, etc.) that allow what has been learnt in past situations to remain valid, although the employees are no longer the same.
<p>Intra-organisational knowledge sharing (Calantone, Cavusgil & Zhao, 2002)</p>	<ol style="list-style-type: none"> 1. There is a good deal of organisational conversation that keeps alive the lessons learnt from history. 2. We always analyse unsuccessful organisational endeavors and communicate the lessons learned widely. 3. We have specific mechanisms for sharing lessons learned in

	<p>organisational activities from department to department (unit to unit, team to team).</p> <p>4. Top management repeatedly emphasizes the importance of knowledge sharing in our company.</p> <p>5. We put little effort in sharing lessons and experiences.</p>
<p>Learning linked to strategic alliances/acquisitions (Kale, Singh & Perlmutter, (2000)</p>	<p>1. The company learnt or acquired some new or important information from the partner.</p> <p>2. The company learnt or acquired some critical capability or skill from the partner.</p> <p>3. The alliance has helped the company to enhance its existing capabilities or skills.</p>
<p>Overall Learning</p>	<p>Mean score across the three scales described above.</p>

3.5.4 Phase 4

The final phase of the research captured secondary data in order to draw links between the variables measured and tangible firm performance. It was important to be able to link the variables to some measure of firm performance in order to contribute to the debate surrounding the extent to which dynamic capabilities result in improved financial performance. Linking back to the importance of capturing complete TMTs, this research focused on complete

TMTs in order to be able to link their tenure as a team to previous financial performance. This would allow for links between the self-reports of sensing, seizing and transforming and financial performance to be made, alongside links between the reporting by the MML of learning and firm performance.

In order to put a measure in place for firm performance, over the minimum tenure of the teams in the study (18 months) the price-to-book ratio was calculated across each of the 32 firms involved in the study. Price-to-book ratio captures the stock market value and compares it to the book value of the firm.

$$P/B \text{ Ratio} = \text{Stock Price} / \text{Total Assets} - \text{Intangible Assets and Liabilities}$$

In order to calculate this ratio for each firm, secondary information was collected from a variety of sources, including the firm, Reuters online, the Thomson One database and information from the FTSE 500. Once the price-to-book ratio had been calculated for each firm over the minimum tenure within the TMT, this was used to relate the major variables within the study to performance. While it is appreciated that the calculation of the price-to-book ratio is not conclusive and does not encompass all the relevant measures of performance, it does allow for some conclusions to be drawn regarding performance. It was also important to ensure that the two industries were captured as a result of such ratios differing across industries.

3.6 Research Ethics

The ethical orientation of this research is directed by guidelines set out by the University of Leeds and the Economic Social Research Council. It is defined by the Economics Social Research Council as 'the moral principles, which guide the research from its inception through to completion and publication of results and beyond' (Economic Social Research Council, 2015:1). Ethical approval was sought and gained from the AREA faculty research ethics committee as a result of the research involving human participants.

As part of the ethical procedure, informed consent was collected from all participants. A copy of the information sheet, to which all participants had to agree, is presented in Appendix E. The information sheet was provided in written format to allow participants to consider the various elements of the research and to sign if they consented to the information being collected. Full anonymity was offered to all participants involved in the study and, consequently, no firm names or individual participants are referred to.

3.7 Initial Data-Preparation Steps

3.7.1 Data Coding and Initial Checks for Statistical Analysis in SPSS

Data was exported from BOS and the PAR platform to SPSS. While data could be directly input into SPSS from the BOS platform, personality data stored on PAR had to be transferred manually. All variables from the three questionnaires were re-coded and re-named in SPSS for the purpose of data analysis. SPSS was the sole platform used for the analysis of the data.

3.7.2 Missing Data

As a result of using BOS and the PAR platform, no participant was able to submit a questionnaire unless all responses had been completed, which reduced the potential for missing data to occur. However, as previously discussed, two firms were unable to take part in the study as a result of TMT members failing to send back complete data sets. In these instances either personality or TMT DC data was missing and the individual participants' parts of these TMTs had to be removed from the data set. Checking for consistency throughout the data set, all data was monitored to ensure that responses fitted in the range of the 7-point Likert scale. A dictionary copy of the complete data set was created and subsequent versions were saved, allowing for individual areas of analysis to take place.

In order to ensure the standardisation of data, questionnaires sent online to CEOs, TMT members and middle management were all measured using the same 7-point Likert scale. This system of standardisation aided the interpretation of the data during the data-analysis stage. Furthermore, statements requiring reverse coding in SPSS were identified during the initial design of the questionnaire and this was translated into SPSS to ensure that variables were treated in the correct manner during the predictive analyses.

The findings chapter presents the descriptive statistics across all of the data sets and presents relevant correlational tests to explore the relationships between key variables. The details of the data-analysis procedure are presented in Chapter Five alongside the core findings.

3.8 Chapter Summary

This chapter has described the individual parts of the study, which make up the total data set. This chapter has justified the use of online questionnaires and has presented the items present in the three questionnaires: 1) NEO PI-3; 2) CEO/TMT questionnaire; and 3) middle management learning questionnaire. As discussed, all items present within the questionnaire (apart from the CEO/TMT-level questionnaire) were adopted from existing scales, which in turn enhanced the reliability of the research instruments used. In the case of the CEO/TMT questionnaire, where scale items were being bought together for the first time, the steps taken to develop the questionnaire have been outlined and are presented in the next chapter.

Chapter 4

Dynamic managerial capabilities questionnaire development

This chapter presents the development of the questionnaire for the online survey completed by the CEO/TMT to capture the dynamic managerial capabilities related to the activities of sensing, seizing and transforming. This chapter directly aligns to research objective one, 'To develop a measurement tool to measure dynamic managerial capabilities at the individual CEO level and the TMT level'. The design of the questionnaire takes into account the literature discussed in Chapter Two and the results of two pilot studies presented in this chapter.

4.1 CEO/TMT questionnaire development

In order to design and develop a questionnaire measuring sensing, seizing and transforming at the TMT level, two pilot studies were carried out. The pilot studies were used to help validate the design of the research instrument, designed for the purpose of this study. Given the abstract nature of dynamic capabilities and the scant empirical treatment of the micro-foundations of dynamic capabilities, the questionnaire was designed and organised by drawing on Teece's (2007) influential framework. The fundamental activities of sensing, seizing and transforming were measured at the team level by capturing responses at the individual level requiring individuals to self-report dynamic managerial capabilities within the TMT. The results of individual TMT members were then aggregated to the team level by taking the mean score of each of the three measures during further analysis presented in the next chapter – this was intended to capture the team level construct. The design of this measurement tool sought to shift attention away from viewing dynamic capabilities at the dominant macro level and thus addresses a research gap regarding the lack of empirical research measuring dynamic capabilities at the important micro level (Zahra, Sapienza & Davidsson, 2006).

The design of the TMT questionnaire was carefully conducted and developed over a period of nine months, with three major revisions taking place during this period. Scale items used in the questionnaire were derived from the literature, a q-sort and telephone discussions with TMT members. The questionnaire sought to measure sensing, seizing and transforming at the team level. It did so by designing a scale that could be used to capture these dimensions across a 7-point Likert scale (Likert, 1932) ranging from Strongly Agree (7) to Strongly Disagree (1) across a range of scale items measuring sensing, seizing and transforming. A Likert scale was employed in order to provide the respondent with the opportunity to express the extent to which they agreed with the statement. Symonds (1924) believed that a 7-point scale resulted in optimal reliability, enabling researchers to capture variance in responses while avoiding the middle ground associated with more common 5-point Likert scales (Cummins & Gullone, 2000). Furthermore, Cummins and Gullone (2000) went as far as to say that 5-point Likert scales should not be used.

The initial design of the scale items used within the questionnaire was based on a detailed literature review and, in particular, an examination of the core theoretical works of Teece (2007), Katkalo, Pitelis and Teece (2010), Roseno, Enkel and Mezger (2013) and Teece (2014). These references from the literature were used to design and formulate the scale items capturing self-reported dynamic managerial capabilities at the CEO and TMT level as explained in more detail below.

In order to identify and extrapolate items for the questionnaire, the conceptual literature on dynamic capabilities was referred to and reflected upon. Notably, aside from the conceptual discussions driving an understanding of the meaning of sensing, seizing and transforming e.g. the work of Teece (2009) and Eisenhardt and Martin (2000), attention was directed towards an examination of those studies which in some vein had attempted to move towards a more empirical focus. One of the first papers used was the work of Ridder (2011) where a capability based approach was applied to an empirical examination of

sensing and seizing. Ridder examined innovation and looked at how sensing and seizing capabilities support innovative practices. In particular, Ridder reflected upon empirical evidence to support theorized constructs and this was used to form the basis for some of the sensing and seizing measures used within the present study. To illustrate this, Ridder referred to how sensing relates to 'seeing opportunities in the outside world' and 'scanning external knowledge sources'. This thinking formed the basis for the item 'as a team we frequently scan the environment to identify new business opportunities'. Such a statement was intended to capture the extent to which as a team, individuals work together to view opportunities through a process of scanning in the outside world. In this vein, sensing is viewed as being a process which is somewhat interpretive in nature, aligning to the original definition of sensing used in this work by Pavlou and El Sawy (2011, p. 243) who refer to sensing as 'the ability to spot, interpret and pursue opportunities in the environment'.

The empirical work of Lee (2001) was also used in order to focus upon the idea of knowledge sharing and his work on sharing/offering feedback was used to form the basis for the item 'as a team we offer one another feedback on a regular basis'. In this vein, feedback was incorporated into the capabilities framework and was used to align to a measurement of sensing to link sensing and the sharing of ideas together.

Another example of how the work of Ridder (2011) was used relates to the development of some of the seizing items used within the questionnaire. Ridder, when reflecting upon empirical evidence aligned to seizing, captured seizing by referring to it, in part as 'combining internal and external views'. It was this thinking that seizing was the transfer of something internal to something external, and potentially vice-versa which drove the researcher to develop two items to measure seizing 'as a team we actively align with firms we have acquired in order to enhance the transfer of knowledge, capabilities and resources' and 'as a team we are effective in transforming existing knowledge into new knowledge'. Both these items, drawing on the conceptual and empirical thinking of Ridder, were used to capture this idea of transformation. Transformation, here thus reflects the mobilisation of resources which Teece

(2007;2012) and Wilden, Gudergan, Nielsen and Lings (2013) both reflect upon and articulate.

Moving away from the work of Ridder, another influential paper in the development of the scale items was the work of Janssen, Alexiev, Hertog and Castaldi (2012). Janssen, Alexiev, Hertog and Castaldi (2012) adopt a multidimensional approach to measuring dynamic capabilities and apply this to service innovation management. This paper was a useful paper driving a number of the items used to capture and measure sensing with four items being taken directly from this scale. The item 'we systematically observe and evaluate the needs of our customers' was adopted directly from the survey items the authors had used to capture sensing. Second, Janssen, Alexiev, Hertog and Castaldi's (2012) measure of sensing 'staying up to date of promising new services and technologies is important for our organisation' became 'staying up to date with new technologies is important for our team' within the present study. The third item extrapolated was 'in order to identify possibilities for new services, we use different information sources' and the fourth item extrapolated for the measurement of sensing was 'we follow which technologies our competitors use' which was adopted but reverse scored within the current study.

To develop measures related to transforming, the conceptual literature was examined with the work of Teece (2012) initially being used to understand the meaning of transforming. Teece argues that transforming is 'inherently difficult to routinize' and this in turn reflects its links to a continual state of change and innovation. Transforming is therefore concerned and underpinned by states of adaptation. The items developed in the scale to measure transforming were therefore measures which focused upon this idea of innovation and the idea of transformation in practice. For example, the scale item 'as a team we are effective in utilising knowledge into new product/service development' was derived from conceptual discussions linking transforming to continual renewal and the transformation of resources e.g. Ambrosini, Bowman and Collier (2009) and Verona and Ravasi (2003). As a result of an examination of the literature, fewer items were developed for transforming. While it is understood that this

has implications with regards to the extent to which differing levels of breadth are being captured, the reduced number of items for transforming can be linked back to Teece's (2012) concern that transforming is a difficult capability to routinize and thus perhaps position in the first instance .

4.2 Questionnaire format

The questionnaire consisted of four sections: demographics, sensing activities, seizing activities and transforming activities. Information related to the demographics of the sample population was captured in order to align the individual TMT member data to his/her personality profile. It was also important to capture this information at the beginning of the questionnaire so it was possible to check/align responses.

The questionnaire consisted of 30 statements, to which each individual participant had to respond measured by a 7-point Likert scale. All of these items can be seen in a full copy of each of the questionnaire [except the NEO PI-3 due to copyright issues] can be found in Appendices F-G.

4.2 Reliability and construct validity of questionnaire items: Q-sort

The questionnaire design process comprised identifying statements and classifying them using a q-sort technique. The Q-sort was carried out to determine the placing of items under the three dynamic capability constructs: sensing, seizing and transforming. In its most simplistic form, a q-sort refers to a form of factor analysis and a way of classifying statements. While traditional factor analysis reviews correlations across a sample of subjects, a q-sort looks at correlations between subjects across a sample of variables.

A q-sort is a data classification technique that can be used to capture shared ways of thinking (Block, 2008). All items were selected from the literature (please refer back to section 4.1 for details). The q-sort serves as a useful tool

to code qualitative data quantitatively (Peterson, Smith, Martorana & Owens, 2003; Miles & Huberman, 1994).

To conduct a q-sort, the researcher had to develop a set of statements that come from the discourse that exists around the issue under consideration, as these are the essence of the subjectivity that later emerges from the sorting of statements by participants. Once all statements had been generated, the participant's job is to sort the statements into the four possible categories with each statement needing to be placed in one of the four categories with there being no restriction as to how many items can go in each category. It is then at this point that the subjective viewpoint of the participants is captured. To help with the sorting of statements, participants have the terms of reference for sorting i.e. definitions and cards. As well as sorting statements into each category, each participant attributed a number to each statement to reflect the strength of fit. A core motivation for carrying out this methodology is that it allows participants to give a view that reflects their subjectivity this is particularly important when designing a new measure for the first time (Cuppen, 2010).

Once all items had been compiled from the literature, a q-sort was used to validate the questionnaire items. The Q-sort method is an iterative process, which forms the basis of assessing construct validity, and improves the reliability of the constructs measured (Brown, 1980; Watts & Stenner, 2012; Nahm, Galvan, Rao & Nathan, 2002). The theoretical basis of the q-sort method is widely supported in psychology research and provides a cost-efficient method and effective way of potentially uncovering problems with new scale items such as any items that do not link/apply to any one of the dynamic capability constructs (McKeown & Thomas, 2013; Sirgy, 1982). As a result of this process the researcher was able to improve the reliability of the measures used to measure dynamic managerial capabilities at the CEO/TMT level.

Method: Q-Sort Details

Participants

A total of 52 individuals, including 18 undergraduate students, 22 doctoral researchers and 12 individuals in positions of management, participated in this study. The age of the student participants ranged from 18-27 ($m=20.4$, $SD = 0.74$) and the age of the members in positions of management ranged from 28-36 ($m=30.7$, $SD = 0.74$). Participants were recruited from three core groups to capture a range of perspectives and it was important to limit the number of managers involved in the study so as to not tap into the core sample population required for the main study.

Overview

All participants individually met with the researcher in March 2014, at which point the Q-Sort goals and procedures were explained. The Q-sorts took place across three locations: Leeds University Business School Cafe, the PhD study centre at Leeds University Business School and a conference room in West Malling, Kent. Written instructions supplemented the verbal instructions delivered at the meeting. Participants were given all necessary materials (i.e., Q-sort item deck, sorting aids including cards and envelopes, written instructions, written definitions) and a 30-minute time frame in which to complete the Q-sort. The researcher was available in person as needed for any questions which arose during the Q-sort. The researcher did not give guidance or a personal opinion regarding the sorting of the items.

The Q-Set

The Q-sort set consisted of 29 items. The items consisted of statements taken from the literature related to the three dynamic capability constructs: sensing, seizing and transforming. A full discussion of how these statements were systematically gathered from the literature is presented in section 4.2. The Q-set, that is, the set of items presented to the participants for placing and

ordering, was constructed by drawing from a variety of sources. While the literature lacks guidance surrounding Q-set item content, Block (1978) does offer a discussion of Q-sort construction that was used to support the development of statements for the Q-sort. A wide realm of literature was consulted in order to develop statements reflective of the three dynamic capability constructs.

Q-sort instructions

The task of the participants was to sort the 29 items from the Q-set into four categories: 1. Sensing, 2. Seizing, 3. Transforming, 4. Other. All participants were provided with academic definitions of the constructs to facilitate a shared understanding of what participants were sorting. The Q-Sort followed free distribution, which allowed participants to place as many statements as they felt appropriate under each heading. Brown (1993) notes that researchers frequently use forced distribution (as seen in the work of Yeun, Bang, Ryoo & Ha, 2014 and Morera et al, 2015) due to it being considered more practical. For example Watts & Stenner (2005) and Bracken and Fischel (2006) refer to forced distribution as reducing unnecessary work and being more practical for participants) However, free distribution offers room for consideration of the cards. Free distribution was thus used to encourage the q-sorters to really think about the statements they were sorting using the definitions as a reference point. The limitation of this approach is however the possibility of an unequal amount of items being placed under each heading due to participants being able to place all items in one category if they so wished – the consequence of this is an unequal amount of items under each category – this could however indicate that some categories have more breadth than others or perhaps are more difficult for participants to understand and so classify. An 'other' category was available to ensure participants were given an option for those items they felt did not fit into the three main dynamic capability constructs. As part of the sorting process, participants had to rate each individual card in terms of how strongly they felt it represented the category in which it had been placed. This rating was applied to allow the researcher to see the confidence/strength a participant had in the item they were placing. A 10-point scale was employed where '1' represents 'low fit' and '10' represents 'strong fit'. The decision to employ a 10-point scale was a methodological decision to offer more variance than smaller likert scales e.g. 7-point or 5-point. The use of a 10-point scale

also provides a higher degree of measurement precision (Wittink & Bayer, 2003). All cards were produced on card and in the same size and font in order to ensure the neutrality of the statements. A marker pen was made available so all participants could rate the fit of the statement.

Participants were instructed to base their sorts on information provided only by the researcher including definitions and standard procedural instructions on how to place the items (Block, 1978).

Results

Descriptive Results

Descriptive results of the Q-sort were evaluated to determine the items ranked the highest and lowest across all 52 individuals involved in the study (see table 7 for the highest and lowest ranked Q-sort items for the full sample). The rankings applied indicate the strength of fit e.g. if a participant has given a score of 10 they are as confident as can be that the item they have placed in that category belongs there. The precedence for applying a strength of fit rating to the statements by participants was driven by Block (1978) and a need to indicate in some way how strongly participants felt a statement fit into a category. All items above a mean score of 6 were kept in and all below this were thrown out of the category. The significance of the mean score of 6+ attributes to scores of less than 6 being considered to show uncertainty as to their placement. The researcher employed a mean score of 6+ following guidance from Block (1978) and did so to be confident that the final placing of categories was valid. As such, the use of a scale of 1-10 strength of fit represents incremental validity over the Q-sort measure.

As a result of the Q-sort, 25 statements were placed into the three headings of sensing, seizing and transforming with mean scores of 6+. Four statements had mean scores lower than 6 or were placed in the 'other' category. Their final placing was considered following discussions with top management team members. Table 8 presents the full list of items, the mean for each item based on the ratings given and the percentage agreement. The information presented

in these tables was used to form the 1st full draft of the questionnaire further developed through telephone discussions with TMT members (section 4.4).

Cross (2005) argues that the application of a q-sort is a robust technique, which captures subjective opinions in the process of scale development. This section has described the Q-sort, a method of assessing reliability and construct validity of questionnaire items at the important pre-testing stage (Nahm et al, 2002). To support this pre-testing stage, conversations with TMT members further shaped the questionnaire before it was then used with the core sample population.

Table 7

Highest And Lowest Ranked Q-Sort Items For The Full Sample.

Table 7 shows the 4 highest ranked items and the 4 lowest ranked items overall and there associated mean. This information is useful as it shows those items which participants felt most confident about their placing e.g. items 1, 2, 18 and 20.

Table 7: Highest and lowest ranked q-sort items for the full sample.

Item Number	Description	Mean*
<i>4 highest-ranking items</i>		
1	As a team we frequently scan the environment to identify new business opportunities.	8.78
2	As a team we look for information within the external environment.	8.92
18	As a team we are effective in transforming existing knowledge into new knowledge.	8.66
20	As a team, when we see a business opportunity, we can	8.46

	seize that opportunity quicker than our competitors can.	
<i>4 lowest-ranking items</i>		
29	As a team, we specifically identify the causes of problems before making important strategic decisions.	2.75
29	As a team we believe that unstable, rapidly changing environments provide more opportunity than threat.	2.15
28	As a team we seek advice from all departments within the firm when making important strategic decisions.	2.00
26	As a team we use acquisitions/alliances as a strategy for managing threats in the external environment.	1.96.

*Item means range from 1-10, with 10.00 indicating the highest possible fit for the item in that category.

Table 8: Means Of Items And Percentage Agreement Amongst Participants.

Table 8 shows each item number, a description of that item, overall mean, final category placing and the percentage of participants who placed the statement in the same category. This information is used to support the validity of the final placing of items as part of the scale development process.

Item Number	Description	Mean	Final Category Placement	Percentage of Participants who placed statement in the same

				category.
1	As a team we frequently scan the environment to identify new business opportunities.	8.78	C1: Sensing	89%
2.	As a team we look for information within the external environment.	8.92	C1: Sensing	72%
3.	As a team we are more reactive than proactive.	6.42	C1: Sensing	69%
4	As a team we often review our product development efforts to ensure that they are in line with what customers want.	6.12	C1: Sensing	62%
5	As a team we have trouble developing and maintaining relationships with external partners.	8.23	C1: Sensing	81%
6	As a team we formally monitor our product quality: where it is good and where it needs improvement.	6.83	C1: Sensing	71%
7	As a team we follow which technologies our competitors use.	7.00	C1: Sensing	56%
8	As a team we often let someone else break new ground and only move into a market once it has been proved profitable.	8.15	C1: Sensing	56%
9	As a team, in order to identify possibilities for new services, we use different information sources.	8.00	C1: Sensing	81%
10	As a team we systematically observe and then evaluate the needs of our customers.	7.36	C1: Sensing	71%

11	As a team we offer one another feedback on a regular basis.	7.16	C1: Sensing	40%
12	Staying up-to-date with new technologies is important for our team.	6.84	C1: Sensing	61%
13	As a team our number one priority is lowest cost relative to our competition.	7.11	C2: Seizing	52%
14	As a team we change on the basis of experiences.	6.04	C2: Seizing	75%
15	As a team we actively align with firms we have acquired in order to enhance the transfer of knowledge, capabilities and resources.	8.56	C2: Seizing	67%
16	As a team we regularly look at the likely effect changes in our business environment will have on our customers.	7.00	C2: Seizing	56%
17	Our competitors would consider us as a team to be fast in responding to their actions.	8.22	C2: Seizing	87%
18	As a team we are effective in transforming existing knowledge into new knowledge.	8.66	C2: Seizing	79%
19	As a team we have effective routines in place to identify value and import new information and knowledge.	7.12	C2: Seizing	41%
20	As a team, when we see a business opportunity, we can seize that	8.46	C2: Seizing	94%

	opportunity quicker than our competitors can.			
21	As a team, we actively encourage interaction between the internal and external environment.	7.34	C3: Transforming	64%
22	As a team we devote a lot of time to implementing ideas for new products/services and improving our existing products/services.	6.56	C3: Transforming	72%
23	As a team we are effective in utilising knowledge into new product service development.	6.32	C3: Transforming	82%
24	As a team we actively align with firms we have acquired in order to enhance the transfer of knowledge, capabilities and resources.	7.14	C3: Transforming	53%
25	As a team we regularly seek to align innovation processes within the firm.	6.12	C3: Transforming	67%
26	As a team we use acquisitions/alliances as a strategy for managing threats in the external environment.	1.96	C4: Other	43%
27	As a team we seek advice from all departments within the firm when making important strategic decisions.	2.00	C4: Other	61%
28	As a team, we specifically identify the causes of problems before making important	2.75	C4: Other	45%

	strategic decisions.			
29	As a team we believe that unstable, rapidly changing environments provide more opportunity than threats.	2.15	C4: Other	48%

Scale Items (Post Q-Sort)

Factor 1: sensing

1. As a team we frequently scan the environment to identify new business opportunities.
2. As a team we look for information within the external environment.
3. As a team we are more reactive than proactive.
4. As a team we often review our product development efforts to ensure that they are in line with what the customers want.
5. As a team we have trouble developing and maintaining relationships with external partners **(Reverse Scored)**.
6. As a team we formally monitor our product quality: where it is good and where it needs improvement.
7. As a team we follow which technologies our competitors use.
8. As a team we often let someone else break new ground and only move into a market once it has been proven profitable **(Reverse Scored)**.
9. As a team, in order to identify possibilities for new services, we use different information sources.
10. As a team we systematically observe and then evaluate the needs of our customers.
11. As a team we offer one another feedback on a regular basis.

12. Staying up to date with new technologies is important for our team.

Factor 2: seizing

13. As a team, our number one priority is lowest cost relative to our competition
(Reverse Scored).

14. As a team we change on the basis of experiences.

15. As a team we actively align with firms we have acquired in order to enhance the transfer of knowledge, capabilities and resources.

16. As a team we regularly look at the likely effect changes in our business environment will have on customers.

17. Our competitors would consider us as a team to be fast in responding to their actions.

18. As a team we are effective in transforming existing knowledge into new knowledge.

19. As a team we have effective routines in place to identify value and import new information and knowledge.

20. As a team, when we see a business opportunity, we can seize that opportunity quicker than our competitors can.

Factor 3: transforming

21. As a team, we actively encourage interaction between the internal and external environment.

22. As a team we devote a lot of time to implementing ideas for new products/services and improving our existing products/services.

23. As a team we are effective in utilising knowledge into new product/service development.

24. As a team we actively align with firms we have acquired in order to enhance the transfer of knowledge, capabilities and resources.

25. As a team we regularly seek to align innovation processes within the firm.

Other

26. As a team we use acquisitions/alliances as a strategy for managing threats in the external environment [Final placing Transforming].

27. As a team we seek advice from all departments within the firm when making important strategic decisions [final placing Sensing].

28. As a team, we specifically identify the causes of problems before making important strategic decisions [Final placing Sensing].

29. As a team we believe that unstable, rapidly changing environments provide more opportunities than threats [Final placing of Seizing].

*three items in total reverse scored

4.4 Construct Validity: Telephone discussions with TMT members

In order to strengthen further the validity of the items used within the TMT questionnaire, a copy of the 30 statements under each heading following the q-sort was discussed over the telephone with 12 TMT members. Those involved had previously been sent a copy of the questionnaire by email. The TMT members involved in the pilot study were contacts of the researcher's husband who agreed to discuss the questionnaire. Over the phone, the wording of the statements was discussed and any statements that were unclear to those

involved were given particular attention. As a result of the second pilot study the wordings of four statements were changed.

Input from the telephone discussions confirmed and validated the initial selection of factors to be included in the questionnaire. First, as a result of the discussions, TMT members felt there was a need to change the wording of Statement 15 under seizing from 'as a team we regularly look at the likely effect changes in our business environment will have on customers'. A recurring theme during the telephone discussions was that managers felt there was a need to define in more detail what was meant by the term 'regularly'. Regularly was deemed to be too general and was thus changed to 'as a team we periodically review the likely effect of changes in our business environment on customers'.

A second revision was made to Statement 14 under Factor 2: seizing. Managers felt that the term 'change' in the statement 'as a team we change on the basis of experience' wasn't the best use of the word, and they felt the need to put a time frame before 'experience'. The statement was changed to 'as a team we adapt on the basis of recent experiences'. This statement was considered to capture more fully the adaptation process that TMTs undertake.

A third revision was made to Statement 27 under the 'other ' category. The original statement read 'as a team we seek advice from all departments within the firm when making important strategic decisions'. When this statement was discussed, the TMT members involved in the pilot study questioned the relevance of referring to 'all departments' and argued that instead the better terminology to use here would be 'the firm's functional areas'. This change was made to ensure that the terms used in the questionnaire aligned well to the terminology commonly used among TMT members within the relevant organisational settings.

A final revision was made to Statement 24 under Factor 3: transforming. The original statement read 'as a team we regularly seek to align innovation

processes within the firm'. Five of the twelve managers who took part in the telephone discussions in some form questioned the general nature of this statement, arguing that it needed to be more specific. In particular, the researcher had several discussions with TMT members regarding what innovation meant to them and a reoccurring theme was that it was necessary to put across that innovation processes take place both internally and externally. This resulted in the statement being changed to, 'as a team we regularly seek to align external and internal innovation processes'.

By going through the questionnaire with the relevant sample population prior to it being released, it was possible to ensure that there were no immediate errors with the questionnaire and that, in general, TMT members understood the questions being asked of them. Therefore, this proved to be a valuable exercise.

Table 8 reports the descriptive statistics of the three variables using individual level data.

Table 7: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Sensing	245	1.60	6.40	4.17	1.10
Seizing	245	2.40	6.80	5.00	0.97
Transforming	245	2.33	6.83	5.19	0.86

Correlational analysis was also carried out with the individual level data to explore the research instrument. Table 9 presents the correlation matrix for the three variables across all 245 TMT members and CEOs involved in the study. As shown in Table 9, when individual data is used a correlation is seen between sensing and transforming ($r = .125$, <0.05). This is a finding that, when explored during further analysis, was not repeated when data was aggregated

to the team level construct. This is relevant, as it suggests the importance of statistically examining the team level construct as a result of differences occurring between individual and team results.

Table 8: Correlation matrix for sensing, seizing and transforming

	Sensing	Seizing	Transforming
Pearson Correlation	1		
Sensing			
Pearson Correlation	-.007	1	
Seizing			
Pearson Correlation	.125*	.038	1
Transforming			

* Correlation is significant at the 0.05 level (2-tailed)

4.6 Chapter Summary

This chapter has explained the design and development of the questionnaire sent to CEOs and their complete TMTs, and how items in the questionnaire were reduced to form the research variables used for further analysis in the next chapter. This step was taken to ensure that the variables used in the data analysis were as reliable as possible. A detailed analysis of the variables described above is used alongside the other variables of personality, organisational learning and firm performance in the form of a correlation analysis presented in Table 13 in Chapter Five. It is recognised that this scale will require future development to improve its internal reliability, which is something that could be explored in future research and empirical testing. As previously stated, sensing, seizing and transforming have not previously been measured in this way at the individual level; therefore, this marks the contribution of this

study to moving closer towards a measurement tool that captures dynamic managerial capabilities.

Chapter 5

Findings

This chapter describes the data analysis of the study, including the findings of correlation analysis and multiple regression.

5.1 Profile of Participants

5.1.1 Description of Sample

In total, 32 CEOs, 213 Top Management Team members, and 533 Middle Management employees participated in the study from a sample of 32 firms across the finance and high technology industries. 30 out of the 32 CEOs were male (94%). This reflects the dominance of males in CEO positions, which is widely documented across the literature with Oakley (2000) referring to the nature of male dominated cultures resulting in a 'scarcity of female CEOs' (p. 321). At the TMT level, whilst male dominance was still seen with 77% of the sample population being male, the study also captured 23% of females at this level. Gender was not captured at the Middle Management level as a result of this level not completing the personality measure. With regards to the age of participants, the youngest CEO involved in the study was 28 and the oldest CEO was 60 ($m = 46$, $SD = 4.68$). At the TMT level, participants ranged from the youngest at 25 to the oldest at 61 ($m=32$, $SD = 3.25$). A variety of ages were therefore captured across the sample population. Age was again not captured at the middle management level.

Characteristics	Frequency	Percentage
Gender	CEOS	CEOS
Male	30	94
Female	2	6
	TMT Members	TMT Members
Male	165	77
Female	48	23
Sample Population		Age Range
CEOS		28-60
TMT Members		25-61

Table 9: Distribution of respondents by age and gender

5.2 Organisational Characteristics

This section describes the organisational characteristics of the respondents including industry type, tenure and team size.

5.2.1 Industry Type

As previously discussed in chapter three, firms from two industries were targeted: finance and technology industries. These industries were chosen in support of previous methodologies with these industries being considered to epitomize the importance of strategic change and adaptability. A total of 32 organisations were sampled and 18 of these were from the finance industry with the remaining 14 firms from the technology industry.

This study encountered difficulty when trying to reach firms to be included in the study. In order to attract the sample population, a great deal of time had to

be spent building relationships with the sample population via networking events and, this in turn restricted the number of firms which could participate in the study. This was further limited as a result of the cost of the personality assessments.

Most of the conversations, which took place, were conducted with either the CEO or TMT member met at a networking event or via the Director of Human Resources. In most cases access to the Director of Human Resources was facilitated through their personal assistant.

The participating organisations were from the finance and technology industries. Firms included in the study ranged from Credit Card Issuers to Chip Production firms. The individual details of firms participating in the study are withheld as outlined in the ethical guidelines proposed in the participant information sheet.

5.2.2 Team characteristics

This section presents the team characteristics of the TMTs studied. Tenure across the 32 TMTs ranged from the shortest at 18 months to the longest at 15 years ($m=2.2$). A minimum tenure of 18 months was used to be able to link dynamic managerial capabilities in the TMT to a level of performance over the same time period. The largest TMT captured consisted of 10 decision makers and the smallest had 5 members. Table 11 presents the descriptive statistics associated with team size for the 32 teams involved in the study.

Table 10: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Variance
Team Size	32	5	10	7.40	1.52	2.31
Valid N	32					

In sum, it was important to capture the demographic characteristics of the sample population. Demographic information associated with the CEO and his/her TMT was captured as part of the personality assessment, which as part of the NEO PI-3 captured the gender, and age of the participant taking part. Due to this study being built upon self-reported individual data aggregated to the team level to capture the team construct, it was necessary to capture team composition variables associated with team size and team tenure. These variables were used to understand the relationship between team composition variables and dynamic managerial capabilities

Table 11 presents a table for the descriptive statistics associated with all major variables involved in the study in which the mean and standard deviation is presented for each of the 30 variables across the 32 teams.

Table 11 is on the next page

Table 11: Descriptives for major variables

	N	Mean	Std. Deviation
1. Team Size	32	7.40	1.52
2. Tenure	32	5.31	4.21
3. CEO Neuroticism	32	56.13	6.82
4. CEO Extraversion	32	55.33	5.46
5. CEO Openness	32	54.66	5.76
6. CEO Agreeableness	32	54.57	7.03
7. CEO Conscientiousness	32	56.67	5.55
8. TMT Neuroticism	32	53.86	3.87
9. TMT Extraversion	32	55.21	3.39
10. TMT Openness	32	55.19	3.66
11. TMT Agreeableness	32	55.10	2.37
12. TMT Conscientiousness	32	55.84	2.66
13. CEO Sensing	32	4.22	1.00
14. CEO Seizing	32	5.16	.723
15. CEO Transforming	32	5.33	.810
16. TMT (without CEO) Sensing	32	4.09	1.01
17. TMT (without CEO) Seizing	32	4.84	.79
18. TMT (without CEO) Transforming	32	5.22	.741
19. Complete TMT Sensing	32	4.16	.861
20. Complete TMT Seizing	32	5.05	.567
21. Complete TMT Transforming	32	5.18	.599
22. Commitment to Learning	32	5.03	.566
23. Systems Perspective of Learning	32	5.05	.600
24. Openness and innovation	32	4.86	.570
25. Knowledge transfer and integration	32	4.94	.482

26. Intra-organisational knowledge sharing	32	5.08	.566
27. Learning linked to strategic acquisitions/alliances.	32	5.11	.583
28. Learning Mean scross 22-27	32	5.01	.380
29. Firm Performance	32	16.50	9.380
Valid N (listwise)	32		

5.3 Correlations between research variables

5.3.1 Pearson correlation results

Correlation analysis was conducted in this study using the variables associated with CEO personality (5 variables), TMT personality (5 variables), CEO dynamic managerial capabilities (3 variables), TMT (without CEO) dynamic managerial capabilities (3 variables), Complete TMT dynamic managerial capabilities (3 variables), team composition (2 variables), organisational learning (7 variables) and firm performance (1 variable). Correlation analyses were conducted in order to identify and in turn summarize the relationships between the 29 variables within the conceptual model presented in chapter one.

Table 13 provides a correlation matrix for the variables presented. According to Field (2005), the default two-tailed test is most appropriate when the relationship and direction between variables cannot be predicted. The results of the correlational analysis therefore allow for a review of significant relationships and, whether changes in one variable result in a positive or negative change in the other. The reporting's of the correlations presented are underpinned by Dancey and Reids (2004) categorisation with 1 reflecting a perfect correlation, 0.4-0.6 a moderate relationship and 0 no relationship.

Table 12 is on the next page.

Table 12: Pearson inter-correlations among 29 study variables (sig. 2-tailed)

Variable	1	2	3	4	5	6	7
1. Team Size	1						
2. Tenure	0.28	1					
3. CEO Neuroticism	-.441*	-0.17	1				
4. CEO Extraversion	0.05	0.03	0.03	1			
5. CEO Openness	-0.19	0.14	0.09	0.11	1		
6. CEO Agreeableness	0.04	-0.20	.381*	0.11	0.12	1	
7. CEO Conscientiousness	0.19	0.15	-0.23	0.23	-0.05	0.05	1
8. TMT Neuroticism	-.415*	-0.33	.388*	0.17	-0.07	0.06	-0.13
9. TMT Extraversion	-0.18	0.27	0.12	.532**	0.17	-0.07	0.21
10. TMT Openness	-0.15	.555**	-0.04	0.29	0.19	-0.34	0.00
11. TMT Agreeableness	0.23	0.25	-0.26	0.17	-0.15	-0.12	0.27
12. TMT Conscientiousness	-0.12	-0.22	0.04	0.11	-0.32	.369*	0.04
13. CEO Sensing	-0.05	0.04	0.03	-0.17	0.26	-0.27	-0.06
14. CEO Seizing	-0.26	-0.02	-0.10	0.07	0.19	-0.06	-0.21
15. CEO Transforming	0.01	0.05	-0.08	0.04	-0.11	0.07	-0.10
16. TMT (without CEO) Sensing	-0.09	0.15	0.19	-0.12	0.23	-0.11	-0.15
17. TMT (without CEO) Seizing	0.12	-0.05	-0.14	0.20	0.05	-0.04	-0.03
18. TMT (without CEO) Transforming	-0.07	0.07	0.05	0.08	0.23	0.02	-0.04
19. Complete TMT Sensing	0.33	0.03	-0.01	-0.02	0.07	0.09	.370*
20. Complete TMT Seizing	0.24	0.02	-0.02	0.09	-0.07	0.14	0.03

21. Complete TMT Transforming	-.526**	-0.13	0.20	-0.06	0.05	0.03	-0.27
22. Commitment to Learning	0.08	0.25	-0.13	-0.21	-0.05	-0.27	-.448*
23. Systems Perspective	0.19	0.22	-0.04	0.00	0.34	-0.22	-0.07
24. Openness and Innovation	0.07	.481**	0.13	0.06	0.15	-0.12	0.04
25. Knowledge Transfer and Integration	0.07	0.16	-0.14	-0.02	-0.03	-0.11	-0.22
26. Intra-organisational Knowledge Sharing	0.24	0.35	-0.23	0.24	-0.08	-0.13	-0.01
27. Learning linked to strategic acquisitions/alliances	0.17	.364*	0.02	.456**	0.13	-0.17	0.04
28. Learning	0.20	.453**	-0.09	0.14	0.13	-0.26	-0.16
29. Firm Performance	0.14	.492**	-0.09	-0.19	0.16	-0.27	-0.21

*p<0.05, **p<0.01

Variable	8	9	10	11	12	13	14
8. TMT Neuroticism	1						
9. TMT Extraversion	-0.14	1					
10. TMT Openness	-0.05	.454**	1				
11. TMT Agreeableness	-0.13	0.20	0.09	1			
12. TMT Conscientiousness	0.08	0.20	-0.28	0.16	1		
13. CEO Sensing	0.16	-0.31	-0.16	-0.11	-0.33	1	
14. CEO Seizing	-0.22	0.24	0.25	0.00	0.19	-0.06	1
15. CEO Transforming	0.16	-0.07	-0.08	-0.11	0.04	-0.04	0.06
16. TMT (without CEO) Sensing	0.16	-0.11	-0.09	-0.19	-0.27	.751**	-0.08
17. TMT (without CEO) Seizing	-0.19	0.02	0.14	-0.10	0.11	0.00	.721**

18. TMT (without CEO) Transforming	0.23	-0.06	-0.17	-0.03	-0.07	0.23	-0.07
19. Complete TMT Sensing	-0.20	0.13	-0.05	.391*	0.09	-0.17	-0.03
20. Complete TMT Seizing	-0.08	0.10	0.15	0.15	-0.06	-0.33	-0.11
21. Complete TMT Transforming	0.07	0.29	0.15	-0.17	0.30	-0.34	0.19
22. Commitment to Learning	-0.20	0.02	0.07	0.13	-0.03	-0.03	-0.04
23. Systems Perspective	-0.09	-0.01	0.19	0.00	-.516**	0.10	0.04
24. Openness and Innovation	-0.01	0.20	0.32	-0.29	-0.18	-0.14	-0.19
25. Knowledge Transfer and Integration	-0.15	-0.01	-0.03	0.03	-0.06	-0.17	-0.19
26. Intra-organisational Knowledge Sharing	-0.17	0.12	0.09	0.09	0.03	-0.08	-0.12
27. Learning linked to strategic acquisitions/alliances	-0.05	.456**	.379*	0.09	-0.13	0.05	0.03
28. Learning	-0.16	0.20	0.26	0.02	-0.23	-0.05	-0.10
29. Firm Performance	-0.23	0.08	.441*	-0.06	-0.34	-0.15	0.01

*p<0.05, **p<0.01

Variable	15	16	17	18	19	20	21
15. CEO Transforming	0.02	1					
16. TMT (without CEO) Sensing	0.23	-0.03	1				
17. TMT (without CEO) Seizing	.749**	0.20	0.10	1			
18. TMT (without CEO) Transforming	-0.16	-.385*	0.04	0.05	1		
19. Complete TMT Sensing	-0.24	-0.27	-0.23	-0.31	0.05	1	
20. Complete TMT Seizing	0.10	-0.19	0.00	0.07	0.05	-0.12	1
21. Complete TMT Transforming	0.23	0.08	-0.06	0.21	-0.31	-0.19	0.26
22. Commitment to Learning	0.12	0.20	0.24	0.26	0.24	-0.14	-0.06

23. Systems Perspective	0.00	0.08	-0.23	0.04	-0.13	0.15	0.01
24. Openness and Innovation	0.17	0.02	-0.15	0.19	-0.12	-0.13	0.11
25. Knowledge Transfer and Integration	0.31	0.05	0.16	.410*	-0.15	0.00	0.04
26. Intra-organisational Knowledge Sharing	-0.20	0.09	-0.01	0.01	-0.16	0.24	-0.31
27. Learning linked to strategic acquisitions/alliances	0.16	0.14	-0.01	0.29	-0.14	-0.01	0.01
28. Learning	0.02	0.12	0.05	0.00	-0.21	0.18	0.00
29. Firm Performance	0.02	0.02	-0.03	0.03	0.28	0.27	0.07

Variable	22	23	24	25	26	27	28	29
22. Commitment to Learning	1							
23. Systems Perspective	0.31	1						
24. Openness and Innovation	0.27	.392*	1					
25. Knowledge Transfer and Integration	.645**	.516**	.424*	1				
26. Intraorganisational Knowledge Sharing	.519**	0.31	.360*	.385*	1			
27. Learning linked to strategic acquisitions/alliances	0.12	0.14	.481**	0.07	0.34	1		
28. Learning	.697**	.662**	.723**	.727**	.715**	.543**	1	
29. Firm Performance	.472**	.533**	.666**	.391*	.403*	.414*	.711**	1

*p<0.05,

**p<0.01

5.4.2 Correlations between team composition variables and CEO/TMT personality and dynamic managerial capabilities (sensing, seizing and transforming)

The team composition variable captured in the study was tenure. In all instances, complete TMTs were captured and it was necessary for team members to have a minimum tenure of 18 months so that it was possible to relate the team level construct to firm performance over the same time period. As highlighted in table 13, TMT tenure was only strongly, positively correlated to one aspect of personality. A relationship was seen between tenure and levels of openness seen within the TMT (without the CEO) ($r = .555, <0.01$). Openness is a trait associated with facets including openness to new ideas and values and is likely to create a pleasant team environment which results in TMT members wanting to stay within the TMT. Openness for example, as seen in the work of Nadkarni and Herrmann (2010) is linked to thoughtfulness and in particular, the perception to other team member needs. Williams, Hoffmann and Lamont (1995) found that although long TMT tenure may prove dysfunctional, TMT tenure and managerial performance are positively related. Reflecting upon this, TMT tenure in this study is linked to one personality trait in particular, openness to experience, a trait, which is positively linked to dynamic managerial capabilities elsewhere in the study. What we therefore see is that more established TMTs have higher levels of this trait reflecting a desire for cognitive exploration of both inner and outer experience. This in turn highlights how someone high in openness to experience may be more open to their own personal development as well as open to experiences in the outside world. Underpinned by intellectual curiosity and complex problem solving, a link between tenure and openness to experience may be interpreted by referring to the work of Stafsudd (2006). Stafsudd (2006) argued that social mechanisms exist which result in people preferring, and therefore recruiting people who are similar to themselves. Supporting previous theoretical work in this area highlighting that homogeneity is reproduced and thus occurs at the organisational, top management and structural level. The finding here that tenure increases openness to experience is one that

complements Stafsudd's (2006) work where she findings that tenure increases homogeneity within the TMT with TMT members clustering together as they recruit individuals similar to themselves. It is therefore possible to relate the finding of TMT tenure to higher levels of openness to experience by linking this to TMT members recruiting others similar to themselves thus raising the overall level of openness to experience within the group. We may therefore expect openness to experience to increase within the TMT if it is present in the first instance within the TMT. This relationship between tenure and openness to experience suggests that as teams develop and grow with each other the level of openness to experience is raised through different mechanisms, one of these being recruitment strategies within the firm.

5.4.3 Correlations between CEO and TMT personality

In the first part of this study and analysis, the CEO was separated away from his or her TMT. This was driven by the CEO often being treated in empirical literature as a separate entity to the coalition of TMT members. Further, the CEO was separated away from the TMT in order to examine and statistically explore the relationship and interface between the CEO and the TMT as a whole. This focus supported previous studies where a case was made for the separation of the CEO away from the TMT (Ling, Simsek, Lubatkin & Veiga, 2008; Lee, 2002; Peterson et al, 2003). This separation allows, in later analysis for the joint impact of the CEO/TMT to be analysed.

In support of table 11, table 13 presents the descriptive statistics of CEO and TMT personality at the domain level captured using the NEO PI-3 measurement tool. A full copy of this information at the more detailed, facet level is presented in appendix I. This study found that some aspects of the CEOs personality correlated with some aspects of collective TMT personality.

To understand and position relationships between CEO and TMT personality theoretical discussions of organisational demography are useful (Pfeffer, 1985). Organisations are full of people and as positioned by organisational theorists it is only natural and appropriate to analyse organisations through a focus on individuals, a premise driving the conceptual model discussed in chapter two. To comprehend an organisation in light of organisational demography work thus requires a focus on needs, values, attitudes and the very characteristics of individuals within the firm. Findings highlighting the links between CEO personality and the personality of TMT members thus add to this body of work where it is argued that similarity is a basis for interpersonal attraction and relation. Linking this back to work on difference scores within this research, similarity and personality homogeneity can be positioned as being positive due to the attraction and relations it promotes. For example, shared experiences, as highlighted in the work of Pfeffer (1985) create a common bond and in a similar vein, similar personality profiles can be positioned as created a common bond which in turn influences organisational practice. Demographic similarity, seen when relationships between CEOs and their TMTs are examined points towards positive relationships 'because similarity is an important property in defining social relationships' (p. 70). This finding and the measure of such is therefore underpinned by Pfeffer (1985) and his position that 'one of the most useful measures of organisational demography are those that assess the extent to which a group of persons is heterogeneous or homogenous' (p. 70). Any similarity between the CEO and the TMT is thus influenced by a number of mechanisms including similarity in time of entry, communication frequency and differences in age which Pfeffer (1985) argues influence final integration and cohesion. This in turn supports the finding in this research that major differences in personality profiles between CEO personality and TMT personality have negative implications for the reporting and thus enactment of dynamic managerial capabilities. Demographic concepts, such as personality help orient us to the relational nature of organisations. The findings of this research therefore that a Extravert TMTs are correlated with Conscientiousness CEOs is one, which suggests that there has been a reasoned attempt at moving away

from similarity in demographic factors to actively bring people in different to the existing CEO. To bring people in, with the intention of them offering new perspectives and outlook is therefore something, which creates dissimilarity in personality in profiles. This could be an active attempt for example, by the CEO to recruit individuals dissimilar to himself or herself to influence the strategic direction of the firm. A CEO high in extraversion may therefore have social networking skills but may lack the consideration of others and their needs and thus may require TMT members to support their actions. Relating back to the organisational demography literature and positioning this alongside the model of personality used within this research, the FFM, the findings between TMT personality and CEO personality highlight a move towards fighting against the inherent similarity found within organisations. However, as previously discussed, this move towards dissimilarity is something which influences the relationship between personality and dynamic managerial capabilities.

Table 13: Descriptive statistics CEO and TMT personality [Domain Level]¹

	Minimum	Maximum	Mean	Std. Deviation
CEO_N	40.00	68.33	56.13	6.82
CEO_E	45.67	66.83	55.33	5.46
CEO_O	44.50	72.50	54.66	5.76
CEO_A	29.50	63.67	54.57	7.03
CEO_C	39.33	69.00	56.67	5.55
TMT_N	48.07	62.28	53.86	3.87
TMT_E	48.42	61.50	55.21	3.39
TMT_O	49.81	62.06	55.19	3.66
TMT_A	50.75	59.60	55.10	2.37
TMT_C	52.13	61.25	55.84	2.66

¹ Domain norms for the sample population the NEO PI-3 was compiled with are available in appendix J. For immediate reference a score between 43-55 is considered to be 'average'.

Valid N (listwise)

N = Neuroticism

E = Extraversion

O = Openness to Experience

A = Agreeableness

C = Conscientiousness

Table 15: Descriptive Statistics for CEO [Facet Level]

	N	Minimum	Maximum	Mean	Std. Deviation
CEO N1 Anxiety	32	34.00	78.00	61.65	12.97
CEO N2 Anger	32	40.00	76.00	58.93	10.35
CEO N3 Depression	32	34.00	76.00	56.12	12.34
CEO N4 SelfConsc	32	31.00	72.00	54.75	11.35
CEO N5 Impulsiveness	32	40.00	85.00	58.43	12.53
CEO N6 Vulnerability	32	27.00	76.00	50.93	11.80
CEO E1 Warmth	32	33.00	78.00	57.68	11.81
CEO E2 Gregariousness	32	27.00	68.00	52.53	11.11
	N	Minimum	Maximum	Mean	Std. Deviation

CEO E3 Assertiveness	32	33.00	77.00	57.06	11.21
CEO E4 Activity	32	24.00	80.00	56.21	12.81
CEO E5 Excitement	32	42.00	72.00	55.53	7.53
CEO E6 Positive Emotions	32	38.00	68.00	53.56	8.15
CEO O1 Fantasy	32	40.00	78.00	57.06	9.68
CEO O2 Aesthetics	32	32.00	74.00	51.56	11.27
CEO O3 Feelings	32	34.00	84.00	51.84	12.14

CEO O4 Actions	32	38.00	79.00	54.62	10.95
CEO O5 Ideas	32	34.00	70.00	55.28	9.03
CEO O6 Values	32	40.00	75.00	57.37	10.05
CEO A1 Trust	32	32.00	72.00	52.50	11.29
CEO A2 Straightforwardness	32	34.00	77.00	57.09	12.14
CEO_A3_Altruism	32	30.00	75.00	52.2500	12.85
CEO A4 Compliance	32	28.00	76.00	55.75	11.76
CEO A5 Modesty	32	24.00	78.00	53.37	11.95
CEO A6 Tender Mindedness	32	28.00	72.00	55.40	11.34
CEO C1 Competence	32	38.00	72.00	54.25	9.51
CEO C2 Order	32	27.00	78.00	55.06	12.11
CEO C3 Dutifulness	32	34.00	75.00	55.09	10.31
CEO C4 Achievement	32	41.00	76.00	61.43	8.38
CEO C5 Self discipline	32	33.00	85.00	59.43	11.96
CEO C6 Deliberation	32	32.00	72.00	55.81	10.45

To aggregate individual responses to the team level, first mean reporting's of personality were used. This resulted in the author being able to calculate the mean levels of each domain within the TMT. Mean levels of TMT extraversion were shown to be positively correlated with mean levels of openness seen within the TMT ($r = .454, <0.01$).

When the relationship between CEO personality and TMT personality was explored, a relationship was found between CEO neuroticism and mean levels of neuroticism within the TMT ($r = .388, <0.05$). Levels of agreeableness found within the CEO were also shown to be positively correlated with mean levels of conscientiousness seen within the TMT ($r = .369, <0.05$).

By capturing the mean levels of personality it was possible to draw broad conclusions related to the exploration of the link between personality traits. This was of interest in order to then relate this to dynamic managerial capabilities. This allowed for steps to be taken to explore the CEO-TMT interface.

To capture an additional measure of the team level construct, standard deviation was used at the team level and a correlational analysis was undertaken to explore if diversity in personality profiles in the TMT related to CEO personality. Table 16 presents the correlations when standard deviation is used and, as shown the higher the level of extraversion seen within the CEO the higher the level of diversity we see across the trait of neuroticism in the TMT, ($R = .61$, <0.01). Further, CEO conscientiousness was shown to be negatively correlated with diversity in TMT extraversion ($r = -.37$, <0.01). This in turn, captures an additional finding when the diversity of personality profiles in the TMT is measured. Diversity in the level of neuroticism rises with the level of extraversion in the CEO. This finding raises the importance of reviewing the team level construct in a way that captures both average personality scores (mean) and diversity within the team (SD). This supports the work of Nielsen (2009) who argues that newly appointed TMT members were more likely to be similar to the rest of the team when homogeneity within the TMT exists. This promotes the need to explore how homogeneity in TMT personality is related to both CEO personality and dynamic managerial capabilities.

Table 16 on the next page

Table 16: Correlation matrix for CEO and TMT personality NEO (using SD for TMT personality)

Variable	1	2	3	4	5	6	7	8	9
1. CEO Neuroticism	1								
2. CEO Extraversion	0.13	1							
3. CEO Openness	0.09	0.10	1						
4. CEO Agreeableness	.381*	0.08	0.12	1					
5. CEO Conscientiousness	-0.21	0.26	0.05	0.04	1				
6. TMT Neuroticism SD	-0.10	.616**	0.08	-0.01	0.30	1			
7. TMT Extraversion SD	-0.29	0.34	0.20	-.378*	0.23	.481**	1		
8. TMT Openness SD	-0.22	0.13	0.27	-0.29	-0.02	.632**	.359*	1	
9. TMT Agreeableness SD	-0.31	0.31	0.02	-0.01	0.06	.584**	0.30	.635**	1
10. TMT Conscientiousness SD	-0.13	0.16	0.30	-0.06	-0.04	.402*	0.23	.593**	.400*

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

5.4.4 Correlations between personality and dynamic managerial capabilities (sensing, seizing and transforming)

Once the relationship between the personality of the CEO and his/her TMT had been established, there was a need to investigate the relationship between personality and the self-reports of dynamic managerial capabilities. For this analysis, the CEO was first separated away from the TMT and then included into the analysis. Correlational analysis was therefore used to explore the relationship between personality and dynamic managerial capabilities (Sensing, Seizing and Transforming) at the CEO level, the TMT (without CEO) level and the complete TMT.

At the domain level, only one finding was found. CEO conscientiousness was shown to be positively correlated with Sensing within the complete TMT ($r = .37$, $p < 0.05$). No relationships were seen between the personality of the TMT with or without the CEO at the domain level. This was measured using both mean and standard deviation.

5.4.5 Correlations between CEO self-reported dynamic managerial capabilities and TMT self-reported dynamic managerial capabilities.

Thus far, the relationship between team composition variables and dynamic managerial capabilities have been statistically examined and the relationship between personality and dynamic managerial capabilities has been explored. This research now moves on to explore the relationship between CEO self-reported dynamic managerial capabilities and dynamic managerial capabilities reported by the TMT. This analysis allows for the relationships between the dynamic managerial capabilities to be uncovered.

A number of interesting and fundamental relationships were found in the study. Firstly, CEO self-reported levels of sensing were shown to be positively related to TMT (without CEO) sensing ($r=.75, <0.01$). Secondly, levels of CEO seizing were shown to be positively correlated with levels of seizing within the TMT ($r=.72, <0.01$). This highlights understanding and support for the underlying construct. Finally, levels of CEO transforming were shown to be positively correlated with Seizing in the TMT when the CEO was excluded ($r=.72, <0.01$). The strong correlations found support the idea that shared cognition exists across the CEO and the TMT.

A strong relationship was seen between CEO sensing and CEO transforming ($r=.74, <0.01$). This suggests that CEOs reported that in general that TMTs had the dynamic managerial capabilities to sense and transform. No relationship was seen with seizing which could imply that it is either more difficult to reflect upon seizing or that seizing was in general weaker within the TMT.

When the self-reports of TMT members were analysed on their own, away from the CEO, a relationship was seen between TMT (withoutCEO) sensing and TMT (withoutCEO) transforming ($r=-.42, <0.01$). This suggests a relationship between the dynamic managerial capabilities of sensing and transforming and yet no relationship with seizing. This could again imply that seizing is more difficult to self-report or it is lacking within the TMT. What is most prominent here however is that whilst the relationship between sensing and transforming at the CEO level is positive as previously discussed, at the TMT (withoutCEO) level this relationship is negative ($r=-.42, <0.05$). This is a finding discussed in detail in the next chapter. Stemming from these findings are a number of questions including why it is that CEO sensing and CEO transforming is positively related and yet at the TMT level this is negatively related.

In sum, the findings here support a relationship amongst some dynamic managerial capabilities and the differences which exist between the self-reports

of the CEO and the TMT. The findings showcase that whilst TMTs are self-reported to have the capability to sense and transform, seizing is less apparent.

5.4.6 Correlations between dynamic managerial capabilities and middle management learning

In recognition that relationships exist between both personality and dynamic managerial capabilities and dynamic managerial capabilities themselves, this research now moves on to examine the relationship between self-reported dynamic managerial capabilities and middle management learning. Middle management learning, measured using self-reports at the middle management level was used to capture the relationship which exists between dynamic managerial capabilities and learning at the MML.

Referring back to the conceptual model presented in chapter one, six measures of learning were explored in relation to the dynamic managerial capabilities of sensing, seizing and transforming at the TMT level. Six variables of organisational learning were measured: Commitment to learning, systems perspective of learning, openness and innovation, knowledge transfer and integration, intra-organisational knowledge sharing and learning linked to strategic acquisitions. Table 17 presents the descriptive statistics aligned to the six measures of learning. Learning measures were again measured on a 7-point Likert scale with 7 reflecting high levels of learning in the firm and 1 low levels of learning within the firm.

A correlation analysis between the six variables of middle management learning and dynamic managerial capabilities was conducted. As per previous statistical analysis in this chapter, dynamic managerial capabilities were captured at three levels: CEO, TMT (without CEO) and Complete TMT.

Table 17: Descriptive statistics for middle management learning

	Rang e	Minimum	Maximum	Mean	Std. Deviation	Varianc e
Commitment to Learning	2.41	3.39	5.80	5.03	.56	.32
Systems Perspective	2.56	3.49	6.05	5.05	.60	.36
Openness and innovation Knowledge transfer and integration	1.65	4.06	5.71	4.86	.57	.32
Intra- organisational knowledge sharing	1.53	4.06	5.59	4.94	.48	.23
Learning linked to SAs	1.90	3.91	5.81	5.08	.56	.32
	2.22	3.74	5.96	5.11	.58	.34

Stemming from the correlation analysis, only one significant finding was found between dynamic managerial capabilities and learning as reported by Middle Management. TMT (without CEO) transforming was shown to be related to one aspect of learning, knowledge transfer and learning ($r=.41$, <0.05). No other relationships were found and thus this study found no support that there is a link

between dynamic managerial capabilities at either the CEO or TMT level and the way in which middle management report learning.

5.4.7 Personality and Middle Management Learning

Whilst no relationships were found between dynamic managerial capabilities and middle management learning some relationships were found between personality and middle management learning. Correlation analysis was used to determine the nature of these relationships. The personality of the CEO and the TMT (without CEO) was examined in relation to the six measures of middle management learning. At the CEO level, one NEO personality domain, extraversion correlated with one aspect of middle management learning: learning linked to strategic alliances/acquisitions ($r=.45, <0.01$). Under more extraverted CEOs, middle management reported higher levels of learning linked to strategic alliances/acquisitions.

This research found support for a positive relationship between CEO extraversion and organisational learning with high levels of extraversion being linked to higher levels of learning within the firm. This finding links to previous work completed by Nadkarni and Herrmann (2010) who reflect upon extraversion as a representation of sociability and expressiveness and show how this influences the way in which CEOs learn. Extending this, this research argues that when you have a CEO who is high in extraversion, their own preference for learning, supported by their sociability and thus opportunity to gain interesting outlooks and perspectives, supports an overall higher reporting of learning by middle management within the firm. Here, the psychological attributes of extraversion are thus linked to organisational cultural elements. This aligns to the thinking of O'Reily, Caldwell and Chatman (2014) who argue that the most obvious aspect of extraversion 'is the propensity to prefer extensive interactions with others' (p. 595). This thought can be extended to apply these extensive interactions to the opportunity to learn and develop at an individual level and due to the position of

authority and influence a CEO has expel this across the organisation. This is further underpinned by the previous work of O'Reily, Caldwell and Chatman (2014) where CEOs high in extraversion were shown to be associated with cultures that are more collaborative. This research supports this thinking due to middle managers reporting that under extravert CEOs higher collaborative learning resulted. Extending and aligning to previous academic discussions across both the strategic management and organisational behaviour literature, this supports thinking that CEOs who exhibit social influence, through extraversion, are able to develop a culture of learning within the firm and in turn influence skill levels across the organisation (Colbert, Barrick & Bradley. 2014). This relationship is therefore one which can be attributed to the very idea that more extravert CEOs will have mechanisms in place to want to create a culture of learning within the firm i.e. greater social interactions and greater social influence e.g. Colbert, Barrick and Bradley (2014), Hermann and Nadkarni (2014), and Palaiou and Furnham (2014). This again can also be linked back to previous discussions on the CEO effect and the very influence of the CEO on influencing cultural practices (Böhm, Dwertmann, Bruch & Shamir, 2015, Lok & Crawford, 2004, and Berson, Oreg and Dvir (2008).

When the TMT was examined without the CEO, three NEO domains were shown in some regard to be related to aspects of middle management learning. TMT extraversion and TMT openness to experience were both shown to be correlated with learning linked to strategic alliances ($r=.46$, <0.01 , $r=.38$, <0.05). The higher the mean levels of extraversion and openness within the TMT, the higher the reported levels of learning linked to strategic alliances/acquisitions by the TMT. TMT conscientiousness was shown to be negatively related to the systems perspective of learning ($r=-.51$, <0.01). The higher the levels of conscientiousness seen within the TMT, the lower the systems perspective of learning reported by middle management within the firm.

In sum, some relationships were seen between personality and middle management learning however, largely these relationships are not particularly telling. In particular, no direct link was found between overall learning (the mean of all other learning measures) as self-reported by Middle management and personality. What can instead be taken is that learning linked to strategic alliances/acquisitions in particular can be predicted through an interpretation of the personality of the CEO/TMT.

5.5 Variables and Firm Performance

It was necessary within this research to explore how the variables discussed thus far relate to the tangible measure of firm performance. In order to create a solid link with something tangible. To start, correlation analysis was used to determine the relationship between middle management learning and firm performance. This was followed by the use of multiple regression.

5.5.1 Correlations between Middle Management Learning and Firm Performance

Middle management learning was shown to be significantly correlated with firm performance. Overall learning, as reported by middle management within the firm was shown to be a significant predictor of firm performance ($r = .71, <0.01$). The strongest predictor found within the study, this study supports that learning within the firm is fundamental to firm performance.

Examining the individual aspects of learning contributed to the measure of overall learning, all six measures of learning were significantly correlated with firm performance: commitment to learning ($r = .47, <0.01$), systems perspective of learning ($r = .53, <0.01$), openness and innovation ($r = .66, <0.01$), knowledge

transfer and integration (.39, <0.05), intra-organisational knowledge sharing ($r=.40$, <0.05) and learning linked to strategic alliances/acquisitions ($r=.41$, <0.05).

5.5.2 Correlation between team composition and firm performance

A relationship was found between the tenure of the TMT and firm performance ($r=.59$, <0.01). The longer a team had worked together, the more likely positive firm performance was to result. TMT tenure was measured by the average number of years, TMT members had belonged to the TMT. This supports previous findings where tenure has been linked to reduced risk (Simsek, 2007), Norburn & Birley (1988), Ensely, Pearson & Amason (2002). In particular, this research supports the link Ensely, Pearson and Amason (2002) made between team tenure and TMT performance. This research has extended this finding by supporting the link between tenure and overall firm performance.

5.5.4 TMT personality and firm performance

Only one significant relationship was found here. TMT openness to experience was shown to be significantly related to firm performance ($r=.44$, <0.05). No other significant relationships were found between personality and firm performance.

5.5.5 CEO-TMT interface

To understand the CEO-TMT interface, the difference between the CEO's reportings of dynamic managerial capabilities and the TMT's reporting's of dynamic managerial capabilities were calculated and are referred to as 'difference scores'. These difference scores essentially refer to that gap which exists between what the CEO reported and what TMT members reported.

Difference scores have also been calculated to examine the difference between the personality of the CEO and the personality of his/her TMT. The calculation of these scores allowed for the relationship between the similarity of the CEO and the TMT to be statistically explored.

6.0 Multiple Regression

Stemming from the theoretical hypotheses developed in chapter two, multiple regression was carried out in order to predict the value of a variable based on the value of two or more variables. In this case, multiple regression is used to understand what variables used in this study can be used to predict variables such as dynamic managerial capabilities, learning and firm performance.

For all multiple regression models presented in this section, the CEO was statistically examined within the TMT and was given equal weighting to any other TMT member. 1-1 weighted CEO/TMT self-reported dynamic managerial capabilities were regressed on the facets aligned to each of the five personality domains. In addition to the 1-1 weighted dynamic managerial capabilities, difference scores were calculated in order to explore the difference between a CEO's score on a particular personality facet and the mean score of the TMT on that same facet. This difference was captured to explore the interface between the CEO-TMT and, in each instance develop a significantly predicting model.

Analysis for the multiple regression takes place at the facet level which is intended to offer a more descriptive interpretation of personality. Paunonen, Haddock, Forsterling and Keinonen (2003) discuss the broad/narrow prediction of behaviour using personality. The authors note that at the lowest level, facets represent 'very narrow, specific, behavioural acts' (p. 414). An understanding that at the facet level, predictive power is increased further supports this. This is highlighted in the work of Paunonen and Ashton (2001) who found that when studying Openness to Experience at the domain level only they were unable to

form any predictive relationships and yet at the facet level the predictive power was enhanced to form meaningful relationships. Personality at the facet level is thus considered to be a strong predictor due to the domain level having the potential to cancel the predictive utility of a facet due to different facets being combined to form the larger domain. This research thus explores personality at both the domain and facet level. The multiple regression and prediction of sensing, seizing and transforming presented in section 6.0 takes place at the facet level to tap into this additional level of detail.

NEO PI-3 captures the five domain scales and the 30 facet scales which in turn allow for a detailed assessment of normal adult personality. The administered measure of personality captured both lower level personality facets and broader level trait measures aligned to the NEO PI-3 scale. The purpose of measuring personality was to be able to examine the relationships between lower level facets, broader level traits and the central constructs of sensing, seizing and transforming. All CEOs and Top Management Team members completed the self-report personality measure and from this an understanding could be gained as to the personality profile of each individual. Due to the quantitative nature of the measure, each domain and facet can be placed along a continuum ranging from very low, low, average, high to very high. If an individual scores 'very high' on extraversion then the researcher at this stage is unaware of what is driving this high score. It is only when the researcher analyses the data at a facet level that it is possible to see perhaps that the very high score of extraversion is being largely driven by high levels of positive emotions within that individual. This is particularly important when you consider a trait such as neuroticism. If a CEO were to score very high on neuroticism, in order to further understand the behavioural dimensions of such there would be a need to uncover the detailed facets of this score. A CEO's very high score in neuroticism being driven by a high score in impulsiveness would show different behaviours to a CEO scoring very high in neuroticism being driven by their very high score in the facet of angry hostility. By analysing at the facet level, it is possible to unravel at a more detailed level the sub-facets, which enable us to predict behaviour more accurately, and essentially this increases the accuracy of prediction.

The analysis now moves on to uncover relationships between personality facets and the concepts presented in the conceptual model [figure 1].

Multiple regression 1 sought to uncover the relationship between personality facets and sensing, as previously discussed, analysis shifts to the facet level to uncover a greater level of detail attributed to the innate measure of facets. This more specific measure in turn facilitates a greater prediction of behaviour when we consider the personality facets as a core determinant. To further explore, hypothesis 1a and 1b multiple regression was used to determine if any of the personality facets of conscientiousness could be used to predict sensing. As shown in table 17, it was found that self-discipline within the TMT explains a significant amount of the variance in the level of sensing seen within the TMT ($F(1, 30) = 7.10, P < 0.05, R^2 = .43, R^2 \text{ Adjusted} = .16$). Self-discipline thus significantly predicts sensing within the TMT ($B = .43, t = 2.66, P < 0.05$).

Appendix K presents the correlations between 30 personality facets measured in the NEO PI-3 and dynamic managerial capabilities. Facets correlating with dynamic managerial capabilities were then used to run a series of multiple regression models. This in turn would pave the way for practical recommendations made in the final chapter. Tables 17-19 present the results of a multiple regression model carried out to predict the dynamic managerial capability of sensing.

For all multiple regression models presented in this section, the CEO was statistically examined within the TMT and was given equal weighting to any other TMT member. 1 to 1 weighted CEO/TMT self-reported dynamic managerial capabilities were explored in relation to the 30 personality facets measured using the NEO PI-3. Each dynamic managerial capability was regressed on the 30 NEO facets and a stepwise variable selection procedure was used. For the prediction of seizing and transforming, in addition to the 1 to 1 weighting of dynamic managerial capabilities, difference scores were calculated in order to explore the

difference between a CEO's score on a particular personality facet and the mean score of the TMT on that same facet. This difference was captured to explore the interface between the CEO-TMT and, in each instance develop a significantly predicting model.

Table 17: Prediction of Sensing

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.41 ^a	.24	.18	.75

a. Predictors: (Constant), Wtd_1_to_1_C5_Self_Discipline

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.31	1	4.28	7.881	.016 ^b
	Residual	18.18	30	.60		
	Total	22.49	31			

a. Dependent Variable: Wtd_1_to_1_Sensing

b. Predictors: (Constant), Wtd_1_to_1_C5_Self_Discipline

Reflecting back on the correlation analysis which showed a significant relationship between conscientiousness and sensing and thus supported an acceptance of H1 'TMT conscientiousness is positively related to the process of sensing', the multiple regression again supports this relationship but highlights the importance of one facet in particular: self- discipline. Studying at the facet level therefore allows for a closer prediction of behaviour based on this more specific determinant. If we look at the multiple regression for conscientiousness and personality facets in more detail as shown in table 18, it can be seen that achievement striving is not related to sensing and as such, H1b can be rejected.

Next, multiple regression was used to test the hypothesis 'TMT extraversion is positively related to sensing, seizing and transforming'. Regression analysis was used to further explore the relationship between extraversion and sensing. The regression analysis showed that none of the extraversion facets had predictive power to influence sensing as shown in table 19.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.64	2.64		.244	.80
	Competence	.04	.029	.29	1.59	.124
	Order	.008	.024	.05	.313	.757
	Dutifulness	.017	.024	.123	.713	.483
	Achievement	-.053	.028	-.306	-1.876	.072
	Self_Discipline	.065	.022	.556	2.999	.006
	Deliberation	-.017	.024	-.130	-.724	.476

a. Dependent Variable: Wtd_1_to_1_Sensing

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	5.085	2.247		2.263	.033
	Warmth	.032	.030	.251	1.046	.306
	Gregariousness	-.031	.025	-.259	-1.229	.231
	Assertiveness	.019	.026	.161	.749	.461
	Activity	.025	.022	.216	1.138	.266
	Excitement	.007	.034	.039	.194	.847

Positive Emotions	-.073	.032	-.440	-2.302	.030
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a. Dependent Variable: Wtd_1_to_1_Sensing

Regression analysis was next used to conduct facet level analysis to predict seizing. To test hypothesis 4 'TMT openness to experience will be positively related to seizing' difference scores were used driven by a want to explore the predictive power of personality homogeneity across the CEO and TMT. Heterogeneity for one particular personality facet: actions, a sub facet of openness to experience was shown to predict seizing within the TMT ($B = -.45$, $t = -2.9$, $p < 0.05$). This shows that the larger the difference in t-score between the CEO on actions and the TMT on actions, the lower the level of seizing reported by the TMT. In relation to hypothesis 4, this finding shows the importance of openness to experience through the sub facet of actions. It however highlights that this is not a straightforward relationship and is only of significance when we consider personality homogeneity.

Support was also found for hypothesis 5b 'neuroticism will be negatively related to the process of sensing'. Anxiety, a facet contributing to the definition of neuroticism was shown to significantly predict seizing within the TMT ($B = -.36$, $t = -2.4$, $p < 0.05$). This finding suggests that the higher the level of anxiety within the TMT, the lower the self-reported level of seizing within the TMT. This is a finding which relates to the idea that anxiety could reduce the extent to which TMT members feel confident to make decisions and grasp opportunities. Anxiety within the TMT can therefore be used to predict those behaviours which result in seizing. Therefore, the importance of monitoring levels of anxiety within the TMT is necessary and important to foster seizing.

Hypothesis 2 'agreeableness will be positively related to seizing'. This hypothesis is supported with regression analysis showing that trust, a facet contributing to the measurement of agreeableness, positively predicts seizing ($B = .31$, $t = 2.05$, $p < 0.05$). This finding shows that the higher the levels of trust within the TMT,

the higher the reported levels of seizing. The implications and interpretation of this will be explored, in detail in the next chapter.

Prediction of Transforming

Multiple regression was used to predict the third dynamic managerial capability: transforming. In hypothesis 1, it was stated that 'conscientiousness is negatively related to the process of transforming'. As a result of the regression analysis, this hypothesis can be rejected. The regression analysis showed that dutifulness, a facet contributing to the definition of conscientiousness, was shown to predict levels of transforming within the TMT ($B = -.50$, $t = -3.22$, $p < 0.05$). What was important here was the level of homogeneity across this facet with heterogeneity resulting in lower levels of transforming. This in turn highlights the importance of conscientiousness, driven more specifically by the trait of dutifulness.

In sum, relationships in this part have been shown between personality facets and sensing, seizing and transforming. The relationships found support the use of personality as a predictor of sensing, seizing and transforming and, interestingly also promote the role of personality homogeneity. This has a number of interesting implications, explored in detail in the next chapter. The analysis reveals that at the domain level, conscientiousness predicts sensing within the TMT, and at the more detailed facet level, self-discipline predicts sensing. With regards to seizing, the results have revealed that the facets of anxiety, trust and actions can predict seizing. Actions and anxiety were shown to predict lower levels of seizing and thus had a negative relationship with this dynamic managerial capability while the facet of trust was shown to positively predict seizing. The final dynamic managerial capability, transforming was shown to be predicted by dutifulness in which, the larger the gap between CEO levels of dutifulness and the TMTs levels of dutifulness, the lower the level of transforming reported by the TMT.

In sum, relationships can be seen between personality and dynamic managerial capabilities and the relationships found support the idea that the personality of

an individual or team can be used and viewed as a micro-level origin of dynamic capabilities. The first to explore this relationship, this link is one which has a number of interesting implications, explored in more detail in the next chapter. The results of the analysis carried out reveal that at the domain level, conscientiousness predicts sensing within the TMT, and at the more detailed facet level, self-discipline predicts sensing. With regards to the second dynamic managerial capability of seizing, the results have revealed that the facets of anxiety, trust and actions can predict seizing. Actions and anxiety were shown to predict lower levels of seizing and thus had a negative relationship with this dynamic managerial capability whilst the facet of trust was shown to be a positive predictor of seizing. The final dynamic managerial capability, transforming was shown to be predicted by dutifulness in which, the bigger the gap between the CEOs levels of dutifulness and the TMTs levels of dutifulness the lower the level of cognitive transforming seen within the TMT.

Next, multiple regression was conducted to further explore those aspects of learning which explain variance in firm performance the most. Multiple regression was used to determine the extent to which individual dimensions of learning explained variance in firm performance. Using the enter method it was found that the six dimensions of learning explain a significant amount of variance of firm performance ($F(6,25) = 7.04$, $P < 0.01$, $R^2 = .62$, $R^2_{\text{Adjusted}} = .53$). The analysis shows that firstly Openness and Innovation significantly predicts firm performance ($\beta = .48$, $t = 3.04$, $p < 0.05$). Secondly, the Systems Perspective significantly predicts firm performance ($\beta = .33$, $t = 2.28$, $p < 0.05$). Thirdly, Commitment to Learning also significantly predicts firm performance ($\beta = .38$, $t = 2.20$, $p < 0.05$). Knowledge transfer and integration, intra-organisational knowledge sharing and learning linked to strategic alliances were not shown to significantly predict firm performance.

Based on those aspects of learning shown to significantly predict firm performance, multiple regression was used to understand if those aspects of

learning could be predicted by the personality of the CEO. Of the five personality domains explored, one personality trait was shown to significantly predict the systems perspective of learning. CEO openness to experience significantly predicts the systems perspective of learning, as reported by Middle Management, ($\beta = .37$, $t=2.11$, $p<0.05$). Next, when trying to predict openness and innovation within the firm, no personality domains were shown to predict this aspect of learning within the firm. Finally, multiple regression was used to determine the extent to which CEO personality domains could be used to predict knowledge transfer and integration within the firm. Of the five personality domains, CEO conscientiousness was shown to predict knowledge transfer and integration ($\beta = -.34$, $t=-1.7$, $p<0.05$). In this instance, CEO conscientiousness was shown to negatively predict knowledge transfer and integration. In those firms, lead by conscientiousness CEOs the lower the reported level of learning aligned to knowledge transfer and integration as reported by middle management.

In order to explore this further, the CEO was dropped into the TMT and given equal weighting. This yielded interesting results. For example, whilst some aspects of personality were shown to significantly predict some aspects of learning, when the CEO was placed in the TMT no personality domains significantly predicted learning.

Multiple regression was also used to explore the CEO-TMT interface. Difference scores were calculated to statistically analyse the difference between CEO dynamic managerial capabilities and TMT dynamic managerial capabilities. From this it was possible to understand if a difference between the CEOs reporting's of dynamic managerial capabilities and their TMT's reporting's of dynamic managerial capabilities had an impact on firm performance.

In relation to firm performance, the difference scores for CEO-TMT sensing, seizing and transforming were shown to explain 20% of the variance in firm performance. The CEO-TMT gap of sensing in particular was shown to

significantly predict firm performance ($\beta = -.40$, $t = -2.41$, $p < 0.01$). In this instance, the larger the gap between the CEO and TMT in their reporting's of sensing, the lower firm performance within the firm. This is an interesting finding and one, which lends itself to the suggestion that there needs to be a level of homogeneity with regards to sensing, the first activity of dynamic managerial capabilities to then promote firm performance. Supporting this further, when multiple regression was used to explore how the difference in reporting's between the CEO and TMT related to overall learning within the firm, difference in self-reports of sensing were shown to significantly predict learning ($\beta = -.40$, $t = -2.3$, $p < 0.01$). The larger the difference in the self-reports has the CEO and the TMT, the lower the level of learning within the firm. This is important due to the already discussed links between learning and firm performance. These findings highlight the importance, which should be placed on the CEO-TMT having a strong alignment in sensing to promote performance and learning within the firm. Difference scores related to seizing and transforming were not shown to have any predictive power of learning or firm performance.

Differences are described by Harrison and Klein (2007) as a 'challenge' (p.1199) and largely this relates to the conceptual issues surrounding the meaning and definition of difference. As presented in the findings chapter of this research, difference in this regard has been found to have negative inferences on the self-reports of sensing, seizing and transforming. This finding that heterogeneity in this context has negative inferences inherently goes against the trail of dominant thought where diversity/heterogeneity is considered a driver of team success e.g. Heyden et al (2013) and Nielsen and Nielsen (2013). With this being said, it is however important not to overstate the findings and to consider that it may be the case that the CEO has a different personality profile, perhaps a product of their journey, demographics, education, outlook on work etc. and that it is this that is influencing the self-reports of the TMT. It is therefore important to recognise that there will be other variables impacting upon the relationship between the CEO-TMT other than personality alone.

A further explanation may be that the decision to treat the TMT as a collective has reduced the extent to which difference can truly be unravelled as a result of individual TMT differences not being collected. By treating the TMT as one this naturally reduces the extent to which a true picture of difference is obtained. What the current study does however show us is that difference matters between the CEO and the TMT and tells us is that there is a need to consider difference in future research in order to understand how difference in personality matters. To extend this, researchers wishing to use difference scores in the future it may be valuable to calculate the difference between individual TMT members and the CEO to build a more complete picture of difference and the implications of such.

By considering personality profiles and the difference between personality profiles, researchers may be more able to offer a more dynamic interpretation of personality, which moves away from a presentation of personality profiles alone. Instead, by looking at difference it is possible to explore inter-relationships.

Personality homogeneity, within the context of dynamic managerial capabilities may be required to support the development of dynamic managerial capabilities but to further explore this more research is required. At present, this finding of the value of personality homogeneity links to a body of literature on personality homogeneity and presents an alternative perspective to the rationale provided by Schneider (1987) that organisations are relatively homogenous with respect to the personality characteristics of employees. The Attraction Selection Attrition model provides a central framework upon which personality homogeneity can be explored and interpreted.

Definitions surrounding difference as presented in the work of Harrison and Klein (2007) tie diversity to difference but often go no further. This has resulted in conceptual issues surrounding the nature of disparity between difference and diversity. What is therefore needed is a greater substantive approach, which allows the meaning of difference to be pinpointed. For example, in this study,

personality diversity has been studied through an interpretation of the collective personality of the TMT. This has implications for the interpretation of this finding as not each point or person in this instance can be represented for instance, it is not possible to identify the difference between the CEO and one TMT member. This paves the way for a greater focus on individual differences and using difference scores to reflect individual points of data. This is to ensure that perhaps one member of the TMT greatly different to the personality profile of the CEO does not influence the results so much so that the actual value of difference is lost in interpretation.

As the construct of diversity is 'murky' (Harrison & Klein, 2007, p. 1201) there are implications for the way in which diversity/difference can be visualised. To extend the current study and to explore the importance of the findings of personality homogeneity, it would be useful to adopt a more qualitative, exploratory approach to understand if TMT members feel they each differ from each other and their CEO. This as highlighted in the work of Harrison, Price and Bell (1998) allows for an exploration of deeper level differences, which tap into something, which cannot be observed. Self reported assessments of diversity have value and this is evidenced across the diversity literature e.g. Horwitz and Horwitz (2007).

To extend any interpretation here, a deeper understanding of within-unit differences is required. To do this, future work should work closely with the initial work of Harrison and Klein (2007) in an attempt to draw on a typology of diversity to give meaning to diversity and difference.

7.0 Chapter Summary

This chapter explains how the conceptual model presented in chapter one has been tested statistically in order to determine the relationship between the variables tested. The process of predicting the relationships relating to the conceptual model includes factor analysis for the questionnaire development, correlation analysis and multiple regression. As a result of this process it was possible to understand and determine where significant relationships within the conceptual model exist.

Pearson correlation analysis was carried out with the 29 variables included in this study. This study has found support that personality should be viewed as a micro-level origin of dynamic capabilities as a result of significant relationships being found between personality at the domain and facet level and dynamic managerial capabilities. Furthermore, this study has also shown that personality can be used as a predictor both of dynamic managerial capabilities as well as middle management learning and firm performance.

This study also found support for the importance of learning within the firm, with overall learning being strongly related to firm performance. In summary, the discussion of the main findings of this chapter will be presented in chapter seven in order to address the research objectives presented in chapter one. The discussion chapter is used to draw out the meanings behind the outcomes presented in this chapter. This in turn leads to a discussion of the practical and theoretical implications of the research presented in the final chapter.

Chapter 6

Discussion

This chapter contains a discussion of the major findings of the study aligned to the central research objectives, the detailed literature review in Chapter Two and the empirical evidence presented in Chapter Four. As reported in the introductory chapter of this study, seven research objectives are presented, which are positioned as driving the empirical focus of the study:

1. To develop a measurement tool to measure dynamic managerial capabilities at the individual CEO level and the TMT level.
2. To explore the relationship between CEO and TMT personality.
3. To explore the relationship between CEO and TMT dynamic managerial capabilities.
4. To explore the relationship between the personalities of the CEO/TMT within the organisation and self-reported dynamic managerial capabilities within the TMT.
5. To examine the relationship between the TMT's self-reporting of dynamic capabilities and organisational learning, as reported by the MML.
6. To explore the relationship between the personality of the CEO/TMT and organisational learning, as reported by the MML.
7. To examine the relationship between CEO/TMT's dynamic managerial capabilities, organisational learning as reported by the MML, and firm performance.

In sum, this chapter discusses the extent to which personality predicts dynamic managerial capabilities and thus can be considered an important micro-

foundation. It also presents a critical discussion of the relationships surrounding dynamic capabilities, learning and firm performance.

6.1 Introduction

This study has investigated the concept of dynamic capabilities at both the micro and macro levels, with the aim of using the findings at the micro level to facilitate a better explanation of phenomena at the macro level. While increased attention has been directed towards the study of the micro-foundations of dynamic capabilities and the increasing prominence placed on individual differences, with the exception of Von den Driesch's (2015) work, personality as a micro-foundation of dynamic capabilities has been largely unexplored.

The conceptual model [see Figure 1 for reference] integrates and synthesises concepts and research findings from across the fields of strategic management and organisational psychology underpinned by the theoretical hypotheses developed in chapter two. Implicit in the conceptual model is the recognition that the traditional activities of controlling costs and improving quality are no longer sufficient. Instead, achieving competitive advantage in the modern-day firm requires a focus on the creation of dynamic capabilities to respond to new organisational forms and heightened competitive conditions. As shown in the seminal works of Teece, increasingly there is a need to focus on entrepreneurial management illustrated by the sensing of opportunities, the seizing of identified opportunities and the transformation, reshaping and redirection of existing capabilities within the firm to address technological opportunities. Highlighting the importance of these managerial activities, Teece argues that in order to understand dynamic capabilities we must first explore their micro-foundations. This study draws on this thinking by positioning personality as a micro-foundation and an important individual difference that must be considered in future research.

This chapter is structured around the conceptual model and the research objectives. A discussion is presented that is focused around the core relationships within the conceptual model under each research objective. Following this discussion, the chapter concludes with attention directed towards suggested modifications to the original conceptual model.

6.2 Research Objective 1: To Develop a Measurement Tool to Measure Dynamic Managerial Capabilities at the Individual CEO Level and the TMT Level

A central aim of this research is to develop a tool to measure dynamic managerial capabilities through the self-reporting of sensing, seizing and transforming at the CEO/TMT level. Despite some limitations related to its reliability, the tool developed shows promise and is fit for the intended purpose of offering an empirical measurement of dynamic managerial capabilities. The data shows that the measurement tool is able to measure the extent to which TMTs agreed with statements relating to the activities of sensing, seizing and transforming. This allowed the researcher to understand the extent to which team members, for example, felt that the team sought knowledge from all departments when making decisions, thus allowing interpretations to be made regarding the wider activity of sensing. The development of the measurement tool also allowed for dynamic managerial capabilities to be related to the two other measurement tools utilised within the study: the NEO PI-3 capturing CEO and TMT personality, and a tool designed to capture macro-level dynamic capabilities through the measurement of learning reported by the MML within the firm. As an outcome of the measurement, the personality of the CEO/TMT was shown to predict dynamic managerial capabilities.

Referring to the conceptual discussions of dynamic managerial capabilities, most notably within the work of Peteraf (2014), this research has sought to extend and contribute to existing discussions by offering an empirical grounding. In this research, the empirical measurement of dynamic managerial capabilities has responded to calls from within the field to move away from the inherently conceptual and somewhat black box nature of dynamic capabilities. The lack of empirical grounding and a focus on proxies, for example, those used in the work of Henderson and Cockburn (1994) and Nerkar and Roberts (2004), have limited the field in terms of its clarity. The aim of this research has therefore been first to conceptualise dynamic capabilities at the micro level and then to measure the specific reporting of sensing, seizing and transforming across the complete TMT.

While it is appreciated that Pavlou and El Sawy (2011) offered a tool to measure dynamic capabilities at a similar level, the tool designed by them focuses on the activity of new product development and a number of complex factors, including environmental turbulence, marketing, technical and managerial capabilities. One aim of this study has been to simplify the measurement of dynamic capabilities by focusing on the design of a tool capable of exploring, in more detail, dynamic managerial capabilities, specifically sensing, seizing and transforming. Pavlou and El Sawy (2011), in their measurement tool, use just three scale items to measure managerial capabilities, with the latter playing a small role in the wider measurement of dynamic capabilities. The consequence of this is that the tool employed by Pavlou and El Sawy (2011) lacks the detail to operationalise the conceptual discussion of dynamic managerial capabilities highlighted in the work of Adner and Helfat (2003). As Teece (2009) highlights the importance of sensing, seizing and transforming at this managerial level, this study has sought to operationalise and measure these important constructs using more detailed scale items.

The identification and isolation of sensing, seizing and transforming has allowed for these constructs to be related to the personality of the CEO and TMT across

the 32 firms studied. What this study has done is to offer a more detailed measurement of managerial capabilities in a manner that allows different activities to be separated and measured within the CEO/TMT. The design of the measurement tool therefore addresses the problem of a lack of empirical grounding across the study of dynamic managerial capabilities. The development of the measurement tool thus has strength in its alleviation of the criticism that dynamic capabilities cannot be measured, with this study arguing that dynamic capabilities can be made and are not born, as suggested by Winter (2003). The strength of the design of the measurement tool lies in the ability to offer an actionable tool to measure dynamic capabilities with which TMTs can identify the extent to which, as a team, they sense, seize and transform within a turbulent environment.

By measuring dynamic managerial capabilities within the CEO/TMT, it may be possible to help managers understand what dynamic capabilities are, and from this it may be possible to offer guidance to enhance dynamic managerial capabilities. The measurement tool can be seen as creating a common language that managers can understand. It could be explained to management to allow them to see what sensing actually means within the TMT; in other words, to look for new opportunities and to gain the opinions of others across departments within the firm. Drawing on the original thinking of Teece (1997), the more that dynamic capabilities are practised within the firm, the easier it is for them to become accomplished. Repeating them requires managers first to identify what sensing, seizing and transforming mean, and could look like, in order then to apply this to discussions and eventual decision-making within the firm.

There is also an argument that dynamic managerial capabilities are perhaps emergent in nature and therefore not amenable to conscious manipulation. If they are not amenable to conscious manipulation, this in turn raises issues regarding the extent to which they can in practice be applied and studied effectively at this micro level. This study has shown that at some level it is

possible to draw on the self-reports of sensing, seizing and transforming and to use this measurement to explore the empirical relationships that exist between these self-reports and individual differences in personality. What it has also revealed, however, is that at this micro level, dynamic managerial capabilities are not related to firm performance, suggesting that micro-level dynamic capabilities are emergent in nature and only tangible with regards to firm performance when studied at the macro level. This is not to say, however, that the measurement of micro-level dynamic capabilities is not important; if anything it paves the way for a greater exploration of how researchers can adopt research methods to capture the detailed nature of dynamic managerial capabilities. The measurement tool offered in this study contributes by first aiming to measure dynamic managerial capabilities to then opening up discussions surrounding the possibilities of developing the measurement of such.

Despite the stated strengths of the measurement tool and the positive implications of developing such a tool, it is recognised that the measurement tool has weaknesses with regards to its reliability, which would benefit from improved development and modification to enhance clarity. To improve the reliability of the measurement tool in light of the data collected, a return to the literature is required to further conceptualise sensing, seizing and transforming to improve the depth of the measures employed. This requires the knowledge gained from this study to be applied to existing studies to further modify the scale items used. In particular, the results of the study have indicated that, of the three dynamic managerial capabilities measured, seizing is an activity frequently shown not to be related to other conceptual factors. This is potentially a substantive issue requiring further thought. The lack of empirical relationship between seizing and other conceptual factors could be explained in a number of ways. Perhaps seizing is more emergent in nature compared to sensing and transforming and thus unable to be amenable to conscious manipulation. If this were the case, then asking TMT members to self-report seizing would be to little avail and thus no empirical relationships would be seen. Furthermore, a possible explanation lies in the possibility that CEO/TMT members find it difficult to relate to the scale items

measuring seizing, thus requiring a modification of the measurement tool. In particular, it may be that the conceptual interpretation of seizing is different to the day-to-day experience of seizing that TMT members have. If this is the case, then it requires empirical studies such as this one to inform future conceptual discussions. Moreover, it is possible that there is simply no relationship between the personality of the CEO, or his/her TMT members, and the activity of seizing. If seizing is positioned as the activity that mediates the initial sensing of an opportunity and the transformation of resources, it may have nothing to do with the personality of an individual with this opening up the need to explore other factors, including, importantly, team behaviour and the role of shared cognition.

Discussions with CEOs and TMT members throughout the course of this study have enabled the researcher to gain a more detailed insight into what dynamic managerial capabilities mean in practice to people working in dynamic and turbulent industries, and the issues surrounding their conceptualisation. CEOs, in particular, highlighted their desire to compete on the basis of something unique and essentially intangible, and more often than not attention is inherently placed on employees within the firm. While CEOs and TMTs are on board with the importance of dynamic capabilities, the majority are unaware of how these could be broken down and focused on in an actionable manner. The study showed that they want a way of being able to work with their TMTs to build and foster dynamic capabilities, and thus an insight has been gained into how the majority of those spoken to view dynamic capabilities as something that can be built. The discussions also highlighted the disparity that exists between conceptual, academic discussions and what CEOs/TMT members require. The difference between the two largely relates to CEOs/TMTs requiring knowledge and articulation of something that could be clearly articulated as a strategy within the firm, thus moving away from the elusive and often vague nature of dynamic capabilities. The information stemming from these discussions can now be used to develop the study further.

As a final point, a continued critical evaluation of the measurement tool is required to develop it to its full potential, which can be described/evaluated with regards to the extent to which the tool offers a reliable platform to measure dynamic managerial capabilities. A central aim of developing the measurement tool would be focused upon improving its reliability through further conceptualisation of the scale items and continued empirical testing. Continued empirical testing with a larger sample set would allow further tests to be carried out to confirm the scale items used in the measure. The researcher therefore views the development of the measurement tool as being central to continued work in this area.

6.3 Research Objective 2: To Explore the Relationship Between CEO and TMT Personality

Treatment of the CEO and the TMT as two separate entities was used in order to infer the relationship between the two. This was echoed most recently by Von den Driesch et al. (2015), who demonstrated the impact CEOs have on dynamic capabilities and argued for the detailed treatment of individual key players within the firm. While studies such as the one by Peterson, Smith, Martorana and Owens (2003) have explored the impact of the CEO's personality on TMT dynamics, to the researcher's knowledge no studies have explored the relationship between the personality of the CEO and that of his/her TMT members. This was felt to be important in order to capture whether the personality of the CEO is reflected in the TMT with which he or she is working. Considered to be complementary to the wider aim of understanding the link between dynamic managerial capabilities and personality, the relationship between CEO and TMT personality was examined to provide an added level of detail regarding personality at these two levels. The separation of the CEO from the TMT has also allowed this study to examine how the extent to which a

similarity in personality profiles across the CEO and TMT influences the reporting of dynamic managerial capabilities. This latter point has proved to be particularly prominent in this study, with findings supporting that the more similar a CEO's personality profile is to that of his/her TMT, the higher the reported levels of dynamic managerial capabilities.

While TMT heterogeneity has been a central focus of team behaviour studies, this research differs from the current consensus by arguing that homogeneity between the personality of the CEO and that of the TMT is actually important. Recognising that TMT heterogeneity research has often produced inconsistent results (Pitcher & Smith, 2001), this research offers empirical evidence showing that, specifically, CEO/TMT personality homogeneity strengthens the reporting of sensing, seizing and transforming within the TMT across particular personality facets. This finding strengthens the thinking of Carpenter and Weikel (2011), who argue that we see greater levels of homogeneity within TMTs and those involved in executive decisions as a result of a tendency for sameness or isomorphism of personality; this is also likely to have been influenced in the current study by focusing upon just two industries. Whereas homogeneity has often been linked to lower levels of creativity, reduced diversity and thus a lack of perspectives, this study offers an alternative viewpoint by arguing that instead personality homogeneity among those at the top can be viewed as beneficial, as it strengthens the alignment that exists between the CEO and TMT and also therefore sensing, seizing and transforming. The findings of this study differ directly from the thinking of Nielsen (2009), who argued that TMT heterogeneity was more likely in conditions of dynamic industry environments. Dynamism was presented by Nielsen (2009) as a driver of heterogeneity. However, Nielsen (2009) did not focus upon personality and instead took the position of building on the attraction–selection–attrition model. This study has focused on one specific individual difference, personality, and thus promotes the value of homogeneity, opening it up as an area for future study.

It is recognised that the measurement of CEO/TMT personality has only scraped the surface of an area that would facilitate an understanding of the CEO–TMT interface in greater detail. What this study has uncovered is that the closer the personality of the CEO to the TMT across specific personality facets, the more likely we are to see reported higher levels of dynamic managerial capabilities. First, this promotes the need to explore personality at the more detailed facet level and, second, to confirm this finding by working with a larger number of TMTs, which, if spread across different industries, would allow this relationship to be viewed away from the potential social processes taking place within the two industries used in this study. As discussed in the literature review, team composition and its impact on the team-level construct is a growing area of interest. A number of team composition variables have been considered in this study and yet no significant impacts were found. Relationships that would have been expected were unable to be supported.

Some form of relationship between the tenure of the TMT and dynamic managerial capabilities would have been expected. Tenure is widely considered to be an important determinant of group process. Conceptually, the longer a team have worked together the more likely we are to see enhanced stability, reduced conflict and increased communication. Further, Mishel and Hambrick (1992) refer to the idea of social cohesion, arguing that tenure is a determinant of social cohesion in teams. While positive links have been established in the field between tenure and group processes, Keck (1997) argued that the longer a team has worked together, the more there is a tendency for the team to revert to the status quo and thus fail to innovate/renew resources. Theoretically, this would be expected to be linked to the lower levels of dynamic managerial capabilities seen within the TMT if tenure were high.

Referring back to the context within which this research has been carried out, there are two possible explanations for a lack of support that tenure has any influence on dynamic managerial capabilities within the TMT. One explanation could be that, because of the fast-paced nature of the industries examined, there

is less time for teams to develop and thus what is important here is how individuals bring dynamic managerial capabilities to the table rather than the shared experience of the team.

6.4 Research Objective 3: To Explore the Relationship Between CEO and TMT Dynamic Managerial Capabilities

A further aim of this study has been to uncover the relationship between dynamic managerial capabilities reported by the CEO and the same dynamic managerial capabilities reported by the TMT. This was explored in order to understand whether a relationship and alignment exists between dynamic managerial capabilities at the CEO and TMT level. Again, the aim here was to separate the CEO and TMT in support of a growing body of scholars arguing for a greater exploration of the interface between the CEO and the TMT (Klimoski & Koles, 2001).

As shown in the previous chapter, this study has found strong support for a relationship between CEO dynamic managerial capabilities and TMT dynamic managerial capabilities. For example, the higher the level of sensing reported by the CEO, the higher the level of sensing reported by the TMT, thus reflecting that, in general, the TMT is able to sense and does so regularly. This offers the opportunity for TMTs to develop and build sensing to achieve advantage.

The measurement tool employed and discussed in Section 6.2 was able to capture the self-reporting of dynamic managerial capabilities and, as such to imply the extent to which each TMT was able to report sensing, seizing and transforming within the TMT. Supporting the position that dynamic capabilities are made and not born, the measurement tool was used to identify capabilities within the TMT, then using this as a basis for the development of TMTs, perhaps through consultation. Reflecting specifically upon the dynamic managerial capabilities of sensing, seizing and transforming, and the relationship between

each within the empirical study, revealed that at the TMT (without CEO) level, a negative relationship was seen between sensing and transforming. The higher the level of sensing within the TMT, the lower the subsequent levels of transforming. There are two possible explanations for this finding. One possible explanation is that TMT members found it easier to self-report sensing and were able to identify this easily and in turn relate to the statements asked within the questionnaire more easily than they could with regards to those scale items capturing transforming. Second, it may be that if TMTs are self-reporting a strong ability of the TMT to sense, this naturally lowers the ability of that team to transform. It may be that at the time of completing the questionnaire, TMT members were involved in sensing and thus unable to report transforming. What is interesting here is that when the relationship between each of the activities at the CEO level was examined, the relationship between sensing and transforming was also shown, but was positive in nature. This could be explained by the CEO being better able to view the bigger picture about the TMT's general ability both to sense and transform. It could also be that the CEO was able to relate to those items measuring transforming more effectively than others within the TMT.

Referring back to the dynamic capabilities framework presented by Teece (2007), he presents sensing, seizing and transforming in his framework with an arrow between each, thus inferring a link between them. Teece argued that in order for a firm to gain competitive advantage, sensing, seizing and transforming would need to be developed simultaneously. However, this was not to say that the three couldn't have incompatibilities. Each with their own merits, it is viable that a TMT would go through different states of sensing, seizing and transforming, with tensions between the three being reconciled as the TMT make decisions. The measurement tool employed captured the general reporting of dynamic managerial capabilities and thus was not able to capture them at a particular point in time. This study therefore cannot comment on the development and evolution of sensing, seizing and transforming, but it can report on the relationships between them. Seizing in all instances was not shown to be related to sensing or transforming. As previously discussed, this could be explained by

CEO/TMT members not engaging with the scale items used to measure seizing, or it could be that the state required to build seizing within the team is fundamentally different to that required for sensing or transforming.

The aim of this study was to understand the relationship between the activities of sensing, seizing and transforming. It was expected that a positive relationship would be seen between all three, with sensing, for example, resulting in higher levels of seizing, and seizing being positively correlated with transforming. In reality, the relationships between all three were less clear-cut than this, highlighting the possibility that they do not adopt a linear relationship as first advocated in the work of Teece. Teece (2007) did, however, argue that 'obvious tensions' conceptually did exist and this study has been able to provide empirical support that these tensions may very well exist.

Teece argued that while different skills and cognitive orientation are required for each activity, if a CEO has 'depth in all three classes of capabilities' the organisation will have a better chance of success. With regards to this study highlighting that no relationship exists between the three dynamic managerial capabilities in a linear fashion, it is necessary to refer back to the conceptual discussions about the need for all three to exist (Teece, 2007; 2009; Lawson & Samson, 2001). This, in turn, raises an inherent issue with regards to how the firm ensures that all three dynamic managerial capabilities exist and can be built within the firm. Herein lays the importance of the team. The CEO must be able to ensure that the TMT are able to work as a team to achieve the different states of sensing, seizing and transforming. Each of these states can be built, fostered and developed through individuals working together, which aligns with the unlikelihood that all three would be found within one individual.

Recognising the need to explore the relationship between CEO and TMT dynamic managerial capabilities further, there is a need to measure some form of interactional interface to capture the interaction existing between the CEO and TMT in a dynamic manner. An interactional interface such as that seen in the

work of Cao, Simsek and Zhang (2010) could be used to place emphasis on other supporting measures, including communication richness, functional complementarity and decentralisation. It is therefore accepted that the conclusions drawn in this study are limited to the context within which the study is placed.

6.5 Research Objective 4: To Explore the Relationship Between the Personalities of the CEO/TMT within the Organisation and Self-reported Dynamic Managerial Capabilities within the TMT

This study aimed to explore the extent to which personality can be positioned as a micro-level origin of dynamic capabilities. Drawing on the importance of personality in the prediction of behaviour, the aim of this study was to relate the personality of an individual, and in particular key decision-makers in the form of the CEO and TMT, to understand if links can be made between personality and the dynamic managerial capabilities of sensing, seizing and transforming. The findings of this study extend the thoughts of Peteraf (2014) and thus reinforce the importance of focusing on the human level to explore dynamic capabilities in more detail. Focusing on the measurement of dynamic capabilities at the individual level, aggregated to the team level, this study has highlighted the importance of understanding dynamic capabilities as micro-level phenomena through the personality of the CEO and his/her TMT. Importantly, this study positions personality as a micro-level origin of dynamic managerial capabilities.

Reflecting upon the literature review presented by Abatecola and Poggesi (2013), they called for more research examining CEO/TMT personality-based, strategic decision-making to be conducted. Theoretical and empirical advancements have taken place, particularly within the study of personality where the development of the NEO PI-3 has provided a gold standard measurement. An inherent difficulty, however, relates to the reliance on self-reported data and the pivotal challenge related to the capture of internal dynamics of individuals and teams

within the firm. This study has therefore isolated personality and dynamic managerial capabilities to understand, in the first instance, whether or not a relationship exists, with initial evidence supporting a relationship.

Within the current study, personality was first explored at the domain level, at which the results indicate that CEO conscientiousness is positively correlated with the reporting of sensing within the TMT. Sensing, as a dynamic managerial capability, relates to both the identification and assessment of opportunities present in the wider external environment. Across the literature, competitive advantage is deemed to be derived within those firms that have individuals who are able to sense opportunities before they materialise. This allows the firm subsequently to seize those opportunities quicker than their competitors (Denrell, Fang & Winter, 2003). As explored within the literature reviewed in this research, at a cognitive level sensing requires individuals and teams who are able to be perceptive and pay attention to the opportunities present. Conscientiousness is a personality domain that can be interpreted and expressed in the form of perception, particularly attention to others, among other behaviours. While Peterson et al. (2003) position conscientiousness as resulting in behaviours that reinforce the status quo, this research positions conscientiousness as a trait that heightens the sensing of opportunities. However, conscientiousness has not been linked either to seizing or transforming, which could provide support for the argument presented by Peterson et al. (2003).

The findings of this study directly contrast with those discussed in the conceptual work of Johnson et al. (2003), who argued that individuals with high levels of conscientiousness were likely to have restricted, narrow vision. This study found no support for this, with conscientiousness instead being linked to higher levels of sensing within the TMT. This study was also unable to provide support for the findings of Nadkarni and Herrmann (2010), which showed a relationship between CEO openness to experience and strategic flexibility driven by perception and change. In the current study, openness to experience was not shown to be related to any of the dynamic managerial capabilities studied. This could be a

result of the domain level being too broad to capture the detail required to uncover the relationships between personality and dynamic managerial capabilities. This aligns with the work of McCrae and Costa (1992), who argued that in order truly to examine the empirical links between personality and organisational factors there is a need to examine the more detailed facet level. This research supports that domain-level interpretations are often not sufficient to shed light properly on the inter-relationships between personality and organisational concepts. As a result of the inherent nature of the scale continuum, within which the t-scores of an individual's personality are placed, domains broadly capture where an individual is placed and, as noted by Costa and McCrae (1992), often see individuals interpreted as researchers as being 'average' compared to the working population. This therefore tells us little about the detail associated with personality and the more specific links that can be made.

Across the personality literature, debates exist about the allocation of facets under domains. This is discussed in the work of Backstrom, Larsson and Maddux (2009) who statistically explore the extent to which facets may be blended and may be related to other factors or may not be related to other facets under the same domain. Hofstee (2003) argued that 'factors could be called broad in a hierarchical sense, as they capture the common variance of a number of variables. Even then, factors are not broad in a conceptual sense but rather narrower than variables, as their internal consistency is higher and their angular position in the trait space is more fixed' (p. 243).

Behaviour and its determinants are complex and multi-faceted in nature. Following this, any study of personality is also multifaceted and this requires subsequent exploration and examination. This thought led Hofstee (2003) to suggest that the NEO PI-3 does not fit a simple structure and instead within this model there is an inherent network between facets and domains. As it stands, the way in which the NEO measures personality has implications for the interpretation of behaviour due to individual facets being interpreted in isolation

rather than as Backstrom, Larsson and Maddux (2009) argue as a combination of different factors at the facet level to allow for researchers to examine particular patterns of facets/trait development.

Personality for strategic management researchers is an important area of study, largely attributed to the personality of CEOs/TMTs being considered to play a relevant role in influencing external dynamics including firm performance. Such results however including those presented in this current study require further and appropriate systematization and discussion to unravel what they mean. If we position personality as having the power to affect strategic decisions, then, there is a need to think about how the domain/facet debate influences the actions of researchers (Abatecola, Mandarelli & Pogessi, 2013). This in turn relates to the actions of researchers to overcome the pragmatic and methodological challenges of facet level research to ensure that relationships not uncovered at the domain level are not missed. The implication of this would be a weakened portrayal of what personality can actually predict.

The very nature of personality, and subsequently the study of such are intangible in nature; we cannot physically see personality traits and thus the nature of traits themselves are an abstraction. In order to understand how people behave, researchers have moved towards a measurement/inference to delve into the complexity of behaviour e.g. Smith (2005) and Roberts, Wood and Smith (2005). An important consideration here, when dealing with such an abstract measure, is to ensure the validity of any measures used which naturally influences the decisions of future researchers.

Moving away from a reliance on self-reported measures within the field, it would be advantageous for future researchers to adopt multiple method approaches to examining the links between personality and strategic management. Moving towards construct validity, the use of more than one method can allow for this to be demonstrated in a way which moves beyond the simple selection of a method because it has a good fit between operation and construct. Personality is

complex and dynamic in nature and, as a result of such the methodological approaches undertaken need to reflect this. This is particularly important for those researchers who are able to measure personality at the facet level. At this level, a large plethora of self-reported data is gained from the individual and to aid the interpretation of such there is a need to reflect upon the thinking of Hogan (1998, 6) who stated that there are two perspectives when examining personality 'personality from the actor's perspective and personality from the observer's perspective'. People who are familiar with an individual, perhaps those working alongside them within a top management team are able to provide a valuable insight into the personality of an individual. This is supported by the thinking of many researchers who advocate the need for multiple measures in personality to promote construct validity e.g. John and Soto (2007), and Pervin (1999). Funder (2002) called for 'the use of innovative techniques that go beyond, without replacing, self-reported measures' (p.639). In light of the domain/facet debate, the interpretation of such, and the varying levels of detail/inter-relationships, multiple methods of personality would allow for the accuracy of what is being collected to be improved, something which future strategic management researchers may wish to consider. This accuracy herein directly aligning to an increased predictive power (Paunonen et al, 2003). With strong and valid measures, including that used within this research, the NEO PI-3 it is possible to shift intangible, unobservable constructs more into the observable realm. This is made more concrete by measures which incorporate a variety of approaches to essentially bring personality measurement to life.

This study highlights the importance of examining personality, both at the domain and facet levels. At the facet level, the findings of this study have shown that self-discipline, a facet contributing to the definition of conscientiousness, can be used to predict the dynamic managerial capability of sensing within the research context. Furthermore, this study found support that anxiety is a facet contributing to the definition of neuroticism, and trust is a facet contributing to the definition of agreeableness; both can be used to predict seizing within the TMT. Anxiety within the complete TMT was shown to predict seizing negatively;

the higher the level of anxiety measured, the lower the level of seizing. This is a finding that supports the measurement of dynamic capabilities and the ability of TMTs to recognise the influence of personality on what goes on within the TMT. For example, if TMT members know they have a high level of anxiety restricting seizing within the TMT, it may be possible to put measures in place to increase seizing. These measures may include self-awareness of inherent weaknesses within the team and training to re-address anxiety to change the way in which it is expressed within the team.

Finally, when predicting seizing within the study, it was found that the difference between the personality of the CEO and the personality of the TMT matters because, at the facet level, a greater difference between the CEO and his/her TMT with regards to the measurement of certain personality facets had a negative impact on dynamic managerial capabilities. For example, the difference between the CEO's score on actions and the TMT's score on actions was shown to influence the prediction of seizing. The larger the difference and thus the greater the heterogeneity evidenced between the CEO and the TMT, the lower the reported levels of seizing. This, in turn, highlights the importance of looking at the difference between the CEO and the TMT at this more detailed facet level. This is an interesting finding and one that was previously touched upon in Section 6.3. What it highlights is a need to consider that heterogeneity may not be best for the development of dynamic managerial capabilities, particularly at the micro level. The homogeneity of personality across the CEO and TMT may be needed to create a strong, unified approach to dynamic managerial capabilities within the TMT. This could, however, result in challenges if the CEO/TMT has homogeneity across personality domains/facets that are unrelated to dynamic managerial capabilities. This suggests that such a team is unable to build dynamic managerial capabilities as effectively as those TMTs with the 'right' personality make-up. This, in turn, has implications for using personality as a recruitment tool when bringing new members into a TMT.

Moving towards the prediction of transforming, this study was able to find support for the idea that the difference between a CEO's level of dutifulness and that of his/her TMT members, a facet contributing to the definition of conscientiousness, had an impact on transforming. In particular, it was shown that the larger this gap is, the lower are the levels of transforming seen within the TMT. This again raises the issue of the negative impact of heterogeneity between the personality of the CEO and the TMT. The further away the CEO is from the personality of his/her TMT members, the less likely it is for dynamic managerial capabilities to be formed.

6.6 Research Objective 5: To Examine the Relationship Between the TMT's Self-reporting of Dynamic Capabilities and Organisational Learning, as Reported by the MML

To explore the relationship between micro and macro dynamic capabilities across the 32 firms analysed it was necessary to empirically examine the relationships between sensing, seizing and transforming at the TMT level and the macro dynamic capability of learning as reported by the MML.

One of the aims of the study was to test and understand the relationship between dynamic managerial capabilities reported by the CEO/TMT and learning, as reported by members of middle management within the firm. The decision to include the MML as a sample population was driven by a want to conduct multi-level research to see the link between the CEO-TMT-Middle Management and then link this to firm performance. Moving away from existing dynamic capabilities research inherently focused upon one level, the decision to use middle management is justified by the ability to capture a more rounded, detailed picture of the 32 firms in question which this research has been able to capture.

Learning was broken down in this way in order to capture the different dimensions of learning seen within the firm related to specific areas including innovation, strategic alliances, and knowledge transfer. Underpinned by the thinking of Zott (2003) dynamic managerial capabilities can be considered to be a core ingredient to learning within the firm. Learning is therefore inherent to the dynamic capabilities framework. Recognising that dynamic capabilities and knowledge management are often used interchangeably, this study contributes to the plethora of research conducted towards how dynamic capabilities and learning support each other and in turn both evolve in similar ways (Winter and Zollo, 2001). In this study learning, was tested in relation to personality, dynamic managerial capabilities and finally, firm performance.

Despite dynamic capabilities and learning often being conceptually shown to be complementarity in nature, this study was unable to provide support for a relationship between dynamic managerial capabilities and learning within the firm existing. The only finding within this study was that the dynamic managerial capability of transforming was positively related to one particular aspect of learning, knowledge transfer and learning. This is a relationship which makes conceptual sense due to the dynamic managerial capability of transforming being linked to the constant renewal and reshaping of existing capabilities to address technological opportunities. This is a finding underpinned by the ability of the TMT to learn from past experiences and move forward.

6.7 Research Objective 6: To Explore the Relationship Between the Personality of the CEO/TMT and Organisational Learning, as Reported by the MML

A further aim of this study was to explore personality and learning, as reported by middle management within the firm. Middle management employees were

used to try and capture a representative sample to determine what was seen within the firm. As well as exploring personality as a micro-foundation of dynamic capabilities, the relationship between the personality of the CEO/TMT was explored in relation to one specific dynamic capability at the organisational level: learning. Six different measures of learning were referred to and the mean of each of these individual dimensions was used to examine statistically the general learning within each of the 32 firms analysed.

This study found that there are relationships between CEO and TMT personality and some aspects of organisational learning. However, no concrete, strong relationship was seen between personality and overall learning within the firm. Here, some possible explanations for the links are put forward, and the theoretical and practical implications are discussed. One aspect of CEO personality was shown to be positively correlated with learning, as reported by middle management. To be specific, CEO extroversion was shown to be linked to learning aligned to strategic alliances/acquisitions. This is a finding that suggests that the more extrovert a CEO is, the more likely middle management are to report that they feel learning has improved following an alliance or acquisition. This is an important finding and one that supports that extroversion can be used to a certain degree to predict the successful outcomes of an alliance/acquisition. Aligned to Nadkarni and Herrmann's (2010) interpretation of extroversion as representing both sociability and expressiveness, a link can be made between extroversion and the extent to which the CEO wants to encourage learning as an outcome of a strategic alliance/acquisition. Furthermore, Abatecola, Mandarelli and Poggessi (2013) highlighted the important predictive power of extroversion in creating a proactive approach within the firm. It could therefore be interpreted that what is being seen here is that the more extrovert a CEO is, the more proactive and prominent is the learning related to strategic alliances/acquisitions.

Looking specifically at the TMT, three NEO domains are shown to be positively correlated with learning. At the TMT level, personality is shown to be a stronger predictor of learning than at the CEO level. This relates again to the team-level

construct and the heightened level of personality when working in a team. This study found strong support that learning linked to strategic alliances/acquisitions is related to extroversion and openness to experience seen within the TMT. Support is thus again provided for the importance of extroversion in supporting learning within the firm.

Moreover, this study found that TMT conscientiousness was negatively correlated to the systems perspective of learning. This is an interesting, yet unexpected finding, and what it suggests is that the trait of conscientiousness, a trait capturing a number of dimensions including competence, dutifulness and achievement-striving, is negatively associated with the extent to which middle management feel the firm is able to produce a system of learning that is widespread and not contained. Systems thinking and that broad span of scope thus reduce across the firms in question under the leadership of those TMTs where conscientiousness is high. In sum, while overall learning within the firm was not shown to be linked in any way to personality, the individual dimensions of learning were shown to be linked to certain personality domains across the CEO and TMT. This discovery reveals the importance of breaking learning down into its individual dimensions.

6.8 Research Objective 7: To Examine the Relationship Between CEO/TMT Dynamic Managerial Capabilities, Organisational Learning as Reported by the MML, and Firm Performance

This study set out to bring greater clarity to the field of dynamic capabilities by examining their consequences. Using the price-to-book ratio as a measure of firm performance, a central aim of the study was to measure the relationship between dynamic managerial capabilities (micro), organisational learning (macro) and firm performance. It does so in order to contribute to current discussions surrounding the financial impact of dynamic capabilities and their relative

importance. Across the dynamic capabilities literature, debates exist as to whether dynamic capabilities result in superior firm performance. As a result of these discussions and the central role they play within the field, it was fundamental for the study in some way to be able to link the factors identified in the conceptual model with a measure of firm performance.

This study measured firm performance using the price-to-book ratio calculated over the same time period as the minimum tenure seen across all 32 TMTs – 18 months. For data collected in 2014, across the TMTs, the price-to-book ratio was calculated for 2012/13 to give an indication of how the reporting of dynamic managerial capabilities and of learning linked to a financial measure at the time. This allowed the study to draw certain conclusions surrounding how specific activities and reporting resulted in performance rather than basing this on predictions. As a measure of performance, the price-to-book ratio offered an opportunity to capture realistically a measure of performance using secondary data sources. It is, however, appreciated that more advanced measures of performance are available (e.g. operating profit margin and turnover ratio), which, if used, may allow for conclusions to be drawn related to specific measures of performance. This is not to say, however, that the price-to-book ratio does not have its strengths, one being the simplicity of the measure and its ability to gauge value, which was a driver in the decision to use it in this study.

While increased attention is directed towards the need to study the micro-foundations and micro-level origins of dynamic capabilities, this study found that at the micro level no relationship between any of the dynamic managerial capabilities and firm performance were found. While this is interesting and unexpected, in hindsight it can also be considered understandable because of the micro level at which these capabilities are being captured. One possible explanation is that at this level dynamic capabilities have not yet evolved into macro-level dynamic capabilities where relationships with performance are expected and are in fact seen within this study [see Section 5.2 for a discussion of the emergent nature of dynamic capabilities].

A further explanation could relate to the measurement of sensing, seizing and transforming, which captures these activities in a general sense, not at a particular moment in time. As a result, it may be that in order for micro-dynamic capabilities to result in performance, time is needed to allow for their evolution. If this were the case, then to link this to performance might require a measurement tool capable of tracking the relationship between dynamic managerial capabilities and activities within the firm, for example, number of opportunities seized or observations of team discussions/decision-making processes. It is argued that to develop work in this vein requires a move towards longitudinal studies, which are explored in greater detail in the next chapter.

The way in which dynamic capabilities precisely affect business performance is still unknown. Here, the results of the study follow the arguments of Eisenhardt and Martin (2000), Winter (2003) and Zahra, and Sapienza and Davidsson (2006), among others, in suggesting that firm performance and competitive advantage come from the configuration of resources over time, thus highlighting the potential for their evolution. In order to build and foster dynamic capabilities within the firm, there is a need to understand how a firm can gear its TMTs towards an operational view of the activities of sensing, seizing and transforming. Thus, while the micro-foundations of dynamic capabilities are not linked to performance, as shown in this study, it is argued here that these are fundamental and should be fostered. They provide an important platform from which to support the way in which the TMT make decisions. The lack of relationship between dynamic managerial capabilities could be further explained by the argument presented by Teece (2007), who states that simply having dynamic capabilities is not sufficient but that it is in essence the application and utilisation of dynamic capabilities. A firm may therefore have high levels of sensing, seizing and transforming within the TMT, but it is only in those firms where we see a high level of something tangible such as learning that we are then able to predict firm performance. In this vein, it is learning at the higher order within the firm that promotes performance.

Moving to the macro level, which has often been positioned as a more tangible study of dynamic capabilities, this study positions learning as a macro-level dynamic capability and, in turn, provides empirical evidence that dynamic capabilities at this level are related to higher levels of firm performance. Significant, positive relationships have been shown across all areas of learning and firm performance. Interestingly, related to the discussion surrounding the fifth research objective, the negative relationship between transforming and the systems perspective of learning is of particular concern because of the strong link between this aspect of learning and performance.

Reiterating existing findings across the field that learning is fundamental to firm performance, this study positions learning as a dynamic capability that promotes the continuous evolution and development of the firm. This study therefore argues that learning is a crucial dynamic capability in itself, playing more than just a supporting role. Where middle management report higher levels of learning, a strong and consistent link with performance is evident. This can be interpreted in a number of ways. It could be stated that learning is fundamental to firm performance, which is evidenced by the direct relationship observed. It could also be that middle management reflected a positive appraisal of the learning practices within the firm and, because of the self-reporting nature of the survey, this could be linked to socialisation processes within the firm and perhaps the presentation of a more idealistic image than the actual reality within the firm. It could also be stated that what goes on in the TMT is isolated from the practices seen elsewhere in the firm, as reported by the MML. A detailed discussion of the possible reasons behind the lack of the dynamic capability micro–macro interface is provided in Section 5.7.

To explore the predictive power of the learning dimensions identified, multiple regression was conducted. Stemming from this, all six aspects of learning were shown to explain a significant amount of variance in firm performance and, in particular, three dimensions of learning were shown to predict firm performance

significantly: openness and innovation, systems perspective and commitment to learning. Moving away from generalised predictions of learning, this study was able to show which aspects of learning in particular strongly contribute to firm performance. By recognising this link, it is possible to put measures in place to focus on these aspects of learning within the firm. In particular, this can be used to guide discussions within the firm to direct the specific nature of learning. The need to create a systems approach to learning, and thus an open/integrated approach, is an area that has commonly been praised as being fundamental to organisational success and can now, as shown in this study, be viewed as a driver of firm performance. The implication is that TMTs and management within a firm can focus on directing attention towards the deliberate creation and evolution of learning within the firm. This, in turn, is influenced by a number of other concepts, notably organisational culture. Learning is a process and by moving away from general interpretations of learning it is possible to promote specific aspects of learning upon which firms may wish to focus to support superior competitive performance, perhaps through training initiatives within the firm.

The overall contribution of this thesis is the understanding that dynamic capabilities within the firm can be traced back to the individual personality of a single person. Building a bridge between the dynamic capabilities literature, psychology and the upper echelons perspective, this research has combined these literatures thus exploring an intersection which is only in its infancy but as originally considered by Teece (2007) looks fruitful. The contribution of this research can therefore be considered a step towards a new direction promoting a greater empirical study of the microfoundations of wider strategic outcomes (Edmondson & McManus, 2007). In particular, this research presents an analysis of CEO/TMT factors – tenure, team size, personality – as well as three fundamental dynamic managerial capabilities: sensing, seizing and transforming. With that, this research has been able to successfully connect the central psychological variable of personality with the dynamic capabilities framework.

Supporting the work of Foss (2011) this research supports and contributes directly to the study of the microfoundations of dynamic capabilities.

As discussed in the work of Barreto (2010) dynamic capabilities researchers are increasingly interested in the way in which capabilities are developed within the firm. Tracing this back to the individual level provides an interesting outlook which explores the determinants of individual level behaviour. This research has thus explored the personality of CEOs and their TMTs as a microfoundation of dynamic capabilities. In line with the traditional thinking of upper echelons theory, the characteristics of those within the TMT affect the processes of sensing, seizing and transforming and in turn the interpretation of decisions influencing respective organisational outcomes (Hambrick, 2007; Hambrick & Mason, 1984).

One of the central findings of this research is support for the homogeneity of personality traits across the CEO and his/her TMT. Through the empirical study of difference scores, this research has been able to show the link between a similarity in personality profiles between the CEO/TMT and self-reports of sensing, seizing and transforming e.g. the larger the difference in actions the lower the self-reported level of sensing within the firm. This finding promoting the value of personality homogeneity supports the theoretical discussion where organisations are treated as being largely homogeneous in nature. Schneider et al (1998) present a central proposition that the organisations are relatively homogeneous with regards to the personality attributes of their managers. This was a large study (N=13,000) across 142 organisations and thus highlights the scope of homogeneity. Linking to this research, the finding here that homogeneity between the CEO and TMT is needed highlights the need to move closer towards a platform where personality homogeneity within the TMT is praised and supported thus moving away from the dominant thought across the field that personality heterogeneity is needed. For example, in a study by Hoffman (1959) the homogeneity of member personality was examined in order to understand its influence on group problem solving. Two groups were used;

one homogenous and one non-homogenous group based on their personality traits in order to understand the influence this had on creative problem solving. The results of the study showed that the homogeneous group were less creative than their non-homogenous group and that; this in turn had an impact on the ability of that group to effectively solve the problem. What the findings of this study highlight is that perhaps personality homogeneity across those personality traits which support dynamic managerial capabilities is needed to ensure that sensing, seizing and transforming can be fostered and enacted effectively within the TMT. In support of this, the field of leadership can be reflected upon and in particular work directed towards embedding leader characteristics within the firm. For example; Giberson et al (2005) extend the work of Schneider, Smith, Taylor and Fleenor (1998) who explored homogeneity of personality in organisations. Using data from CEOs and 467 employees across 32 organisations, the authors found evidence for within organisation homogeneity of personality. This also supports theoretical work by Schein (1992) and Schneider (1987) on leader-follow congruence. Supporting this theoretical discussion, the findings of personality homogeneity being positively related to sensing, seizing and transforming is one, which fits well and contributes to the debate and thus the work of Giberson et al (2005) and Schneider, Smith, Taylor and Fleenor (1998). The empirical support within this research for personality homogeneity between the CEO-TMT highlights within organisation homogeneity but also highlights the value of this for dynamic capabilities. In doing so, it highlights the importance of looking at personality homogeneity in a positive frame of mind as opposed to one, which is often linked to negative team level outcomes and specifically reduced diversity.

Linking this back to literature specifically exploring TMTs, Nielsen (2009) presents a useful paper which explores why TMTs look the way they do. Looking at the antecedents of TMT heterogeneity, Nielsen (2009) argues that individual-level social psychological processes promote homogeneity within the TMT but that through organisational and environmental factors a move towards heterogeneity is often promoted. They also note that newly appointed TMT members were

likely to be more similar to the rest of the team when homogeneity within the TMT was high. However, linking this to the dynamic business environment, homogeneity was shown to be lower within dynamic industries. This work informs and can be used to interpret the finding of personality homogeneity within this research. For example, it can be used to support the finding of this research that homogeneity exists and secondly, it can be used to argue that if the 'right' personality traits exist within the top management team then, it is possible to move towards a greater dynamic state, one, not necessarily driven by heterogeneity as argued by Nielsen (2009). A novel finding supporting personality homogeneity thus requires deeper exploration and opens up discussions as to why, within dynamic industries, the selection and recruitment of the right people is more important than any organisational encouragement of heterogeneity and practice.

This argument of personality homogeneity is however one which goes against a stream of existing empirical and theoretical work which argues that the heterogeneity of TMTs is associated with heterogeneity of strategic change efforts and outcomes. However, as raised in a critical discussion by X very little work has been directed towards looking at this from an individual lens (exception of Eggers & Kaplan, 2009). It may well therefore be, as support in this research found that at the individual level personality homogeneity also has a role to play in supporting and developing dynamic capabilities. If this is the case, then this also opens up discussions surrounding what happens when a TMT have a fundamentally different personality profile to their CEOs and the implications of this for long term strategic success. To explore this further would require longitudinal study, which would be valuable to support initial interpretations developed in this research.

The theoretical link between dynamic capabilities and personality within this research supported by empirical study is one, which extends and complements the work of Nadkarni and Herrmann (2010) where, CEO personality, strategic flexibility and firm performance were examined. This research extends Nadkarni

and Herrmann's work and previous research by highlighting the importance of CEO/TMT personality in driving dynamic managerial capabilities. It also does so by indicating how each facet of CEO/TMT personality either enhances or inhibits the dynamic managerial capabilities of sensing, seizing and transforming. This is a body of literature which promotes the need to consider, at an empirical link, how individual differences may influence wider organisational practices. In turn highlighting the very need to look at microfoundations.

This chapter argues that micro-level dynamic capabilities evolve within the firm and it is only at the macro level that a direct relationship with firm performance can be seen. Learning within the firm facilitates performance, which creates a foundation for the further continuous development of dynamic capabilities. Learning itself is continuous and it is likely that what is being seen in this research is that a lack of relationship between the micro and macro levels is a result of other factors influencing this relationship and thus mediating it, including, for example, organisational culture and managerial autonomy – factors not captured in the current study. Companies must break old habits and replace them with new ones; learning can therefore be viewed as a dynamic capability, as it epitomises a fundamental part of what is required to compete in an increasingly dynamic environment, and it is a fundamental capability that should be given attention.

This study first underscores the usefulness of viewing learning as a dynamic capability to understand better how organisations adapt and create value. It does more than just support the development of dynamic capabilities; it drives performance directly and argues that learning is a dynamic capability. Second, it is proposed that dynamic capabilities strengthen with use and it is implied here that the more dynamic capabilities are used, the more we will see them result in performance. This promotes the need to review the evolution and journey that dynamic capabilities take within the firm. This offers an opportunity to expand the current study in future work. Finally, this chapter has discussed the role of personality as a micro-level origin of dynamic capabilities and importantly the

need to start an exploration of dynamic capabilities with a focus on individual differences. While these may not be directly related to firm performance, this supports their evolutionary nature and thus the need to examine dynamic capabilities over a period of time in order to understand them properly.

The issue of chance findings

Stimulated by a bold claim by Ioannidis in 2005, Ioannidis argues that it is possible to question most published research findings and argues that in fact most can be deemed to be 'false'. This claim emerges from a reliance on statistical significance which could lead to false positives in situations where effect sizes are smaller, where there are small sample sizes or where there is less upfront preselection of tests (p. 124). Chance findings are influenced by the case/variable ratio which, within personality research is often an issue due to the large number of facets/traits being measured for each individual. For example within this study for each individual, 35 variables were measured. While parameters set by statistically significant results allow a calculation of chance to be determined, chance findings refer to those false positives, which may simply occur through chance alone and thus may not actually be significant. In any statistical research, there is a need to consider the extent to which a relationship has occurred as a result of something more than mere chance alone. Despite, statistical significance levels being widely used for this purpose, the work of Ioannidis (2005) has questioned the foundation of this.

Sherman and Funder (2009) present a paper, which evaluates correlation analysis in studies of personality and behaviour. In their research, the authors argue that when dealing with broad measures of personality, any correlation table produced is likely to have a high number of correlations some of which will have appeared by chance. On the one hand, while studies such as this one provide rich descriptive data that contributes to the field of personality psychology, on the other it does provide data, which can be difficult to evaluate.

When dealing with personality, due to the high number of variables present, difficulties relate to findings capitalising on chance. Sherman and Funder (2009) argue that the solution to this problem is not to stop conducting broad descriptive studies which they argue are useful particularly due to the contribution they make to the question – how does behaviour relate to personality but instead, there is a need to think about how confident a researcher can be in reporting findings which may have appeared by chance. The calculation provided by Sherman and Funder (2009) has been used in this present study which allows the researcher to be confident that approximately 15 of the 47 significant correlations could have occurred by chance. The difficult and inherent problem is however that it is difficult to know which have occurred by chance. As a result, there is a need to have an open and frank discussion about chance findings and the implications of such for researchers.

The purpose of this research was to determine if a relationship between CEO/TMT personality, dynamic managerial capabilities, learning and firm performance exist, driven notably by an exploration of a relationship between personality and dynamic managerial capability behaviour. The study can be considered to be exploratory in the first instance. This approach, as argued by Funder (2009) is a necessary starting point in research but does raise the possibility of capitalising on chance. This has resulted in, as argued by Funder (2009) researchers focusing upon a few personality traits or factors which he argues could mean full, rich datasets are disregarded. In this research, the full, rich dataset is presented and while this raises issues of chance findings, it also stimulates discussions on the prediction of behaviour using personality. With this being said, there is still a need to consider the issue of chance findings and the implications this has for the way in which the research is interpreted. It is important to ensure that the conclusions drawn are linked to existing theoretical constructs where possible to give them a conceptual foundation/basis.

As argued by Ioannidis (2005) a pure gold standard of quantitative research is unattainable and thus there is a need to work with chance findings, in recognition of their occurrence. While larger samples help to move towards a situation where false positives results are less likely, not all studies lend themselves to large-scale evidence. For example, in the present study, access to the sample population, while interesting was limiting in nature. While a reliance on statistical significance dominates quantitative research, Ioannidis (2005) argues that researchers need to move away from 'chasing statistical significance' and instead positions that a range of R values should be reflected upon. A future extension of this study would thus benefit from an interpretation of the data to move away from its heavy reliance on significance levels to draw the findings of the research. One way of doing this would be to employ a mixed methods methodology to support the interpretation of quantitative findings.

When interpreting the results presented, readers need to understand the concept of chance findings which requires the researcher to be up front about their potential occurrence. Any results discussed therefore need to be interpreted by the researcher in a particular context and the reader needs to understand that there is a possibility that the relationship being seen is by chance alone. The work of Sherman and Foster (2009) has been used to calculate that 15 correlations would be expected by chance and in this study, 47 significant correlations have been reported, significantly higher than those expected by chance alone (Sherman & Funder, 2009).

The significant relationships found in the present study are interesting and have formed the basis for the discussions within this chapter and in most cases link closely to existing theoretical foundations or interestingly go against mainstream thought e.g. the relationship between personality homogeneity and dynamic capabilities. When research supports existing findings there is an assumption that the relationship seen has occurred more than just by chance alone but instead has occurred as a result of a relationship actually existing. For example, the

relationship between conscientiousness and dynamic managerial capabilities is one, which naturally makes sense to interpretation and thus does not appear random to the reader. If a personality trait such as neuroticism or a facet such as anger had been linked to dynamic managerial capabilities than perhaps this would have left the reader confused as to why this might have occurred. Thus, despite this being statistical, objective research, there is a need, as with any research, to interpret the results within a context to give meaning to such. It is however recognised that this logic is not infallible and this research has now reflected upon the debate surrounding significant levels in this research. All of the significant findings at the 0.01 and 0.05 level are findings, which can be explained or interpreted through theoretical foundations thus giving the researcher confidence. However, it is also important to reflect upon the challenges of basing findings on significant findings alone.

Chapter
Conclusion**7**

This chapter contains information about the research contributions stemming from this study related to its theoretical and practical aspects. The implications of the research are evaluated in order to identify the contributions made, followed by a discussion of its limitations and recommendations for future research.

First, this study has identified and measured dynamic managerial capabilities at the CEO and TMT level and, in turn, provided empirical support for the relationship between the dynamic managerial capabilities of sensing, seizing and transforming and the personality of the CEO and TMT. It has shown that some aspects of the personality of the CEO and TMT can be used to predict dynamic managerial capabilities within the TMT. With regards to the measurement of dynamic managerial capabilities, this research has created a new measurement tool that has responded to calls to move away from the conceptual dominance currently seen within the field. Positioning personality as a micro-level origin of dynamic capabilities, this study contributes to a growing body of research promoting the need to understand the influence of individual differences on the enactment of dynamic capabilities within the firm. As a starting point, this study has shown some interesting relationships between personality and dynamic capabilities at the micro level, notably the TMT.

Second, this study has identified that while no support was shown for micro-level dynamic managerial capabilities being positively related to firm performance, one specific dynamic capability at the macro level, learning, was shown to be a significant and strong predictor of firm performance. This study supports viewing learning as a dynamic capability in its own right and, in turn, the importance of identifying the linkages that exist between micro and macro dynamic capabilities

within the firm to further support the empirical measurement of such to achieve clarity within the field.

7.1 Research Contributions

The central aim of this study is to contribute to the dynamic capabilities literature by exploring the importance of the personality of the CEO/TMT as a micro-level origin of dynamic capabilities. This study therefore directly contributes to the increased attention being directed towards the study of the micro-foundations of dynamic capabilities, and contributes, in particular, through a measurement tool intended to capture and measure dynamic managerial capabilities. By making the activities of sensing, seizing and transforming measurable it is possible then to explore these empirically in relation to individual differences, such as personality, used in the present study. The relationships between CEO/TMT personality, dynamic managerial capabilities (sensing, seizing and transforming), learning at the MML and firm performance were examined by looking at 32 firms from the finance and technology industries. Through a detailed literature review and a discussion of emerging research gaps present within the current discussions, the development of the conceptual model took place. The examination of the conceptual model produced empirical results, which have implications for how we can understand the micro-foundations of dynamic capabilities. This study has, in turn, opened up a platform for future empirical study of a field dominated by theoretical discussions. The specific research contributions are discussed below.

7.2 Theoretical Contributions

This study aims, more generally, to contribute to the field of strategic management, focusing specifically upon dynamic capabilities. The majority of the

previous studies examined dynamic capabilities from the macro perspective and thus very little attention was directed towards the role of the individual or the team in creating and enacting dynamic capabilities. Furthermore, discussions within the field of dynamic capabilities are largely conceptual/theoretical in nature, resulting in a lack of empirical tools to measure the constructs discussed. This study contributes to an understanding of how an examination of individuals and teams within the firm allows for the prediction of the managerial dynamic capabilities. CEO/TMT personality, as a predictor of dynamic capabilities, has been identified as being separate to the previous identification of micro-level origins, including CEO experience (Rodenbach & Breteel, 2012) and neuroeconomics (Hodgkinson & Healey, 2011). The theoretical contribution thus relates to the development of the conceptual model and the clarification of relationships between the conceptual factors identified and examined in the empirical study.

The multi-level exploration of the firm in this study has generated a theoretical understanding of the relationship between dynamic managerial capabilities within the CEO/TMT and the reporting of learning within the firm. The use of quantitative data has strengthened the theoretical understanding regarding both the influence of the CEO on TMT dynamics and the relationship between dynamic managerial capabilities at the TMT level and what we see elsewhere in the firm at the middle-management level, for example.

In this study, some aspects of personality have been shown to be linked to some aspects of dynamic managerial capabilities and to be a strong predictor for learning within the firm. It has identified the empirical relationships that exist between personality across both its core domains and supporting facets, and the predictive power of the personality of dynamic managerial capabilities and learning.

While it is widely recognised that dynamic capabilities are an increasingly important construct, it is one that has not previously been linked to personality. As a field, dynamic capabilities is often surrounded by ambiguity and, in turn, treated as a black box construct. This study therefore sought to contribute on a theoretical level by showing how the personality of the CEO and his/her TMT could first be related to dynamic managerial capabilities, and then attention was directed towards the subsequent empirical relationships of dynamic managerial capabilities, learning and firm performance.

7.3 Practical Contributions

Personality should be considered when focusing on how TMTs can develop dynamic managerial capabilities. What this study has highlighted is that individuals are important, and in order to understand dynamic capabilities we must start with an understanding of the role of the individual and teams within the firm. This study therefore provides a basis from which to understand how the personality make-up of a CEO and his/her TMT is important and the implication this has on activities and practices elsewhere in the firm.

Business environments are increasingly dynamic and uncertain in nature, and as a result firms need to be able to develop dynamic capabilities. While this study was unable to support a direct link between dynamic managerial capabilities and firm performance, it was able to show the importance of learning in predicting firm performance. On a practical level this study has contributed to an understanding of how the personality of the CEO/TMT influences the enactment of dynamic capabilities through the expression of personality traits/facets. Across the multi-level firm, this study has also extended the existing thinking by highlighting the important links between the CEO, the TMT and the MML.

Dynamic capabilities do not exist in isolation and instead can be considered to be a predominately team-level phenomenon.

On a practical level, this study has extended previous research by highlighting not only the importance of examining dynamic capabilities from a micro perspective but also the importance of CEO/TMT personality. Particular reference has therefore been made to how each domain or facet of personality either enhances or inhibits dynamic managerial capabilities within the TMT. This, in particular, has highlighted the importance of separating the CEO from his/her TMT in order to understand, in practical terms, what this means for the relationships shown.

As a further practical contribution, this research has provided a new measure of dynamic managerial capabilities at the individual level, which have been used to measure self-reported dynamic managerial capabilities within the TMT and thus the activities of sensing, seizing and transforming. Chapter Four provides details of the development of this measure. This study therefore offers a platform for the future empirical measurement of dynamic managerial capabilities within the firm. By moving away from the abstract, black box nature of dynamic capabilities, it positions dynamic capabilities as a managerial practice upon which managers can readily act. The measurement of dynamic capabilities at the micro level also enables a common language to be developed, enabling TMTs to be able to self-report and capture levels of sensing, seizing and transforming within the team.

7.4 Limitations of the Research

Having identified the contributions of the study, this section will now discuss the limitations of the study employed. This will lead to a discussion of recommended future areas of research. Despite the contributions this study has made, there are a number of limitations, mainly concerning the generalisability of the findings. At the macro level, this study only considered two sectors, finance and technology, and within these two sectors a total of just 32 firms were considered.

The first limitation related to time and budget constraints. This study was founded on a need to capture and measure the personality profile of the CEOs and their TMTs. Using the PAR online platform, individual, on-screen test administration cost \$2.25 (approximately £1.46) per person involved in the study. In order to reduce costs, a student researcher rate was offered by PAR and the price quoted reflects this 50 per cent discount. As a result of the cost of the personality assessments, numbers were limited regarding what could realistically be achieved within the study. It would be hoped that in future this study could be extended by conducting a greater number of personality assessments. If a bigger sample had been employed, the findings could have been statistically analysed in a different manner. For example, a larger sample size of at least 160 firms, and preferably 320 firms, would have facilitated a more advanced analysis such as multivariate structural equation modelling to test the conceptual model. This more advanced statistical analysis may help to concrete the relationships that exist between personality and dynamic capabilities and to understanding the moderation/mediation effects of such.

A second limitation relates to the low reliability scores of the measurement tool designed to measure the dynamic managerial capabilities of sensing, seizing and transforming within the CEO/TMT. Across the literature, there was no existing

research instrument that could be used, which resulted in the design of the new tool. The internal reliability measures conducted were not ideal but were deemed suitable enough to move forward to test the relationships. Future empirical testing and development of the measurement tool, and the scales used within it, would help to improve the reliability measures reported.

A third limitation relates to a dependence on self-reported data in this study. According to Podsakoff, MacKenzie, Lee and Podsakoff (2003), this can contribute to the problem of common method variance where biased correlations exist between psychological and organisational research. This study, and the conclusions drawn from it, are therefore limited by the self-reported data used. A move away from self-reported data would require a move towards more observational, longitudinal studies. It is, however, recognised that using self-reported data is still a powerful tool and does enable relationships between research variables to be examined. To limit the issue of common method variance, Podsakoff et al. (2003) note the importance of using validated and reliable measurement tools. Where possible, such measurement tools were used in this study.

A fourth limitation, driven by the use of cross sectional data within the research, is the potential occurrence of reverse causality. Particularly within cross sectional studies, the direction of cause and effect can be difficult to assess and as such, this limitation and possibility must be considered and discussed (Flanders, Lin & Pirkle, 1992). Causation can be very difficult to prove empirically and as such theory has been used where possible in an attempt to clarify the interpretation of the direction of causality. For example, the causation between personality and core variables within the conceptual model from the perspective of trait theory would be unlikely to run the other way. This is underpinned by the inherent assumption that personality traits are genetically influenced and developed in infancy leading to their stability by the age of 30 (Ardelt, 2000; Costa & McCrae, 1992). In this vein, personality traits actively

influence, (as shown in this research), the self-reports of sensing, seizing and transforming with this relationship likely, informed by theoretical thought to be one directional only. However, if personality is used as a recruitment tool, it is possible that reverse causality could occur. For example, when firm performance is high, a firm might include more managers who are high in openness in its Top Management Team. Considerations such as this have thus been reflected upon in the discussion chapter.

A fifth limitation refers to the small sample size used within this research. There is a need to consider the use of regression analysis given the small sample size of $N=32$ firms. While this was considered an appropriate tool at the time of the study, in hindsight it may have been more valuable to have used a non-parametric test suitable for a smaller sample. While non-parametric tests lend themselves well to small sample sizes they lack the power attributed to parametric tests and thus it is believed that the best approach is to develop this further in future publications by targeting a greater number of TMT members. It must however be considered that although 32 firms were included in the multiple regression, across the 32 firms there were more than 233 participants, a sample size which moves closer to that deemed statistically reliable (Nunnally, 1978). Despite this it is important to consider the implications of the tool employed due to there being implications of having a small sample size when using multiple regression. The implication and thus limitation of such is that with a small sample the precision of the model is reduced (Maxwell, 2000; Israel, 1992). Precision refers to the width of the confidence interval for an effect size. The narrower the width, the more precise the results are. Based on the small sample size used in this study, the precision of the multiple regression is lowered. Based on the work of Cohen (1992) a sample size of 29 for 80% power would result in a population effect size of $\eta^2 = .50$ and an estimated precision of 95% CI $\{.15, .85\}$. This could be improved to a population effect size of $\eta^2 = .30$ to move closer towards precision if a sample size of 84 was used (Cohen, 1992). The impact of low precision relates directly to the confidence we can have in the results and in addition this is likely to raise the likelihood of type 1 and type 2 errors (Button et

al, 2013). The impact and discussion of results must therefore not be overstated and must be aligned to the low precision of the multiple regression carried out as part of the data analysis. To conclude, by developing the sample size it is possible to increase statistical power and in turn precision. It does so by reducing the standard error and enhancing confidence (McClelland, 2000).

Future work needs to be carried out to obtain a larger sample to allow for this analysis to be added to and for a sample size closer to $N=300$ to be achieved (Israel, 1992). The second implication of using a small sample size for multiple regression is that it impacts upon the external validity of the results i.e. the extent to which the results can be generalised to a larger population due to the effect size being lower. The implication of this is that it certainly limits the wider meaning of the results obtained. As a result, there is a need to ensure that the interpretation of the results is within the realistic realm of what can actually be reported. While the results are meaningful for establishing the relationship between personality and dynamic capabilities, without replication, the impact of these results for the wider world is limited to the narrow context within which this research exists (Field, 2009; Pallant, 2013).

A final limitation, driven by the use of cross sectional data within the research, is the potential occurrence of reverse causality. Particularly within cross sectional studies, the direction of cause and effect can be difficult to assess and as such, this limitation and possibility must be considered and discussed (Flanders, Lin, Pirkle & Caudill, 1992). Causation can be very difficult to prove empirically and as such theory has been used where possible in an attempt to clarify the interpretation of the direction of causality. For example, the causation between personality and core variables within the conceptual model from the perspective of trait theory would be unlikely to run the other way. This is underpinned by the perspective that personality traits are genetically influenced and developed in infancy leading to their stability by the age of 30 (Ardelt, 2000; Costa & McCrae, 1992). In this vein, personality traits actively influence, (as shown in this

research), the self-reports of sensing, seizing and transforming with this relationship likely, informed by theoretical thought to be one directional only. However, if personality is used as a recruitment tool, it is possible that reverse causality could occur. For example, when firm performance is high, a firm might include more managers who are high in openness in its Top Management Team. Considerations such as this have thus been reflected upon in the discussion chapter.

Reverse causation is a substantive issue that bedevils some areas of research and is widely discussed in particular across the HRM literature. In the current study it applies to all aspects of the research. Aside from relationships with personality, reverse causation may exist with regards to the relationship between organisational learning and financial performance. It might not be that the more an organisation encourages and fosters learning within the firm that performance results but it may be that because a firm has higher financial resources they are able to invest in, more widely, mechanisms across the firm, which support organisational learning. Secondly, the conceptual model presents that sensing, seizing and transforming cause organisational learning within the firm. It is however possible that as organisational learning increases the processes of sensing, seizing and transforming also increase. For example, the more employees learn within the firm, the more the culture adapts to be more open to sensing as a company. The issue of reverse causation is a methodological shortcoming of this study and this is therefore a limitation, which must be considered. Taticchi, Prowse and Prowse (2010) argue that reverse causation is a difficulty, which is encountered largely by the HRM literature.

Paauwe and Boselie (2005) argue that multi-level analysis in particular increases the possibility of reverse causality. This is a challenge for multi-level research and one, which has resulted in calls for greater attention to be directed towards this issue. Within the present study, the multi-level nature of the research is valuable and allows for various perspectives to be examined e.g. individual, team and

organisational. Using this study as a foundation, greater emphasis would have to be placed on theoretical development to establish the direction of relationships presented within the conceptual model. As raised in the work of Van Veldhoven and Verhagen (2004) and Katou and Budhwar (2014) reverse causation is a challenge for many fields and is one, which requires acknowledgement in the first instance. At present, this research is unable to ascertain the direction of the relationships and thus this is brought into the discussion to ensure any relationship is not inherently overstated.

7.5 Recommendations for Future Research

An exploration of the linkages between micro-level and macro-level dynamic capabilities should be considered for future study. As revealed in this study, no relationships were empirically shown between dynamic managerial capabilities within the TMT and the macro dynamic capability of learning within the firm. A methodological approach suitable of capturing the interaction between micro–macro linkages needs to be developed and this could lie in the adoption of mixed-methods research. A field currently dominated by quantitative studies, the adoption of a mixed-methods methodology would allow for research instruments such as interviews to be used to gain detail about how employees within the firm view and interpret the interactions between the translation of TMT activities and dynamic capabilities across the firm. It is necessary to understand the nature of these interactions to move towards the development of a measurement tool to examine these linkages at a more operational level.

Despite the prominence of dynamic capabilities in strategic management research, as a field, dynamic capabilities have to face up to the criticism voiced within the scholarly community. Future research can derive benefits from such

criticism to improve the explanatory power of work published. Qualitative studies could be used to reveal, for example, the personal beliefs of CEOs/TMT members and how this interacts with dynamic capabilities. Addressing, in particular, the criticism directed towards the definitional issues within the field, future research should be focused not only on proof of existence but also on personality and individual behaviour within dynamic environments.

Addressing the *how* question is fundamental to understanding dynamic capabilities. While studies such as this one have shown a relationship between individual differences and dynamic managerial capabilities, what is not yet known is how dynamic capabilities are developed and how they evolve within the firm. A case study approach should be considered for future study in order to work closely with TMTs to view how they make decisions and how they actually sense, seize and transform. Researchers observing TMTs could view strategic decision-making in relation to sensing, seizing and transforming. While the current study is able to capture the general reporting of sensing, seizing and transforming within the TMT, it isn't able to show whether these occur simultaneously or separately. A case study approach, working closely with a select number of TMTs, could be used to understand what it actually means to sense, seize and transform in the most practical terms to enhance the operationalisation of dynamic capabilities. This understanding could be used to return to conceptual discussions and to apply a practical interpretation to them.

Other variables, for example, a measure of dynamism and a more detailed measure of firm performance, should also be explored to develop the conceptual model. A better development of the measurements presented in the original conceptual model will be needed to improve their reliability and subsequent validity for future study. In particular, several performance measures could be used in addition to the market/book ratio used in the current study in order to show whether a dynamic capability such as learning is related to specific areas of either short- or long-term performance including profitability and liquidity. An

area of particular importance is the measurement of managerial cognition, something that very much underpins this research. The next step in developing the current study would be to capture shared cognition within the TMT and how this relates to dynamic managerial capabilities. This would require the development of a tool that is able to capture processes of shared cognition, with the researcher recognising the importance of the work of Ensely and Pearce (2001) in developing the theoretical foundations of shared cognition in TMTs and the development of mental models. This is an area dominated by theoretical discussions and thus requires empirical treatment, in a similar vein to the study of dynamic capabilities. The researcher identifies the measure of shared cognition as being fundamental to the development of this study.

Further,, in order to develop this study, attention should be directed towards the importance of longitudinal studies and the longitudinal effects of capturing the interdependencies of micro–macro dynamic capabilities and individual characteristics. Longitudinal research would shed light on the developmental path/evolution of dynamic capabilities starting at the important individual level. This would allow for a further understanding of how personality relates to corresponding changes at the organisational level. This would be an interesting area to develop the conceptual model and the present study in support of understanding the development of dynamic capabilities from the micro to macro level within the firm.

Finally, to develop this study, it would be beneficial to calculate the price-to-book ration, the financial performance measure used within the study, at various points across the focal time period in order to more accurately reflect the CEO's/TMT's effects on firm performance. To achieve this would require additional analyses to examine how over the average tenure of the TMT, performance changed. This would tell us how performance had changed, and the extent to which it had changed over the tenure of the TMT. As a financial measurement outcome, this could be used to more accurately reflect the

influence the TMT were having on performance as opposed to other market influences.

7.6 Conclusion

The overall contribution of this study is the understanding that the personality of key leaders within the firm, the CEO and his/her TMT, can be used as a predictor of the micro-level dynamic managerial capabilities of sensing, seizing and transforming. The outcomes of this study can be considered as a first step to promoting personality as a micro-foundation of dynamic capabilities. In particular, by offering a measurement tool to capture dynamic managerial capabilities within the CEO/TMT, this study has allowed for dynamic capabilities to be quantitatively analysed and for empirical relationships to be reported.

Supporting the idea that CEOs and their TMTs are typically in the strongest position to influence organisational outcomes, CEOs and TMTs can be considered to be most influential in fostering dynamic capabilities. Drawing on the earlier work of Hambrick and Mason (1984) in support of the link between CEO personality and decisions within the firm, this study has demonstrated in a modern-day setting how personality influences the enactment of dynamic capabilities, and this understanding can be used to gain new insights into how individuals can and do foster the deployment of dynamic capabilities within the firm.

This study also provides important predictors of dynamic managerial capabilities in the form of the personality domain of conscientiousness and the facets of self-discipline, actions, anxiety and dutifulness. It has shown not only the importance of studying personality but also the need to understand the extent to which differences exist between the personality of the CEO and his/her TMT. The more a difference exists between CEO and TMT personality, the more likely we are to

see a negative influence on dynamic managerial capabilities. This is an interesting finding and one that differs when compared to much of the team literature supporting heterogeneity within the TMT. It is therefore a finding that requires further exploration to reconcile this potential inconsistency. This study has empirically shown the need to encourage homogeneity between the CEO and the people he or she works with within the TMT to create a unified base for dynamic managerial capability creation.

Findings from the multi-level study reveal a strong link between learning and firm performance. Learning, positioned as a dynamic capability within this study, is shown to be strongly related to higher market/book ratios across the 32 firms analysed. This, in turn, supports a link between one specific dynamic capability and firm performance, with this link being direct in nature. What is interesting is that no relationship was shown between dynamic managerial capabilities within the TMT and firm performance. This study argues that while the study of dynamic capabilities at the micro level is fundamental to uncovering detail and furthering understanding, dynamic capabilities are only linked to performance at the macro level. In turn this has revealed the need to understand the interaction that exists between the micro–macro dynamic capabilities. This study revealed no relationship between sensing, seizing and transforming at the TMT level and learning, suggesting that micro dynamic capabilities evolve into macro dynamic capabilities that are in turn related to performance.

In sum, this study concludes that it is important to begin with an understanding of individual differences when examining dynamic capabilities. It highlights the importance of studying the personality of the CEO/TMT and shows personality to be a predictor of sensing, seizing and transforming within the CEO/TMT. Thus, if we can understand and measure the personality of individuals within the TMT, it will be possible to predict the extent to which we will see sensing, seizing and transforming within the TMT. Finally, of all the variables studied, the strongest relationship was shown between learning and firm performance. This study

provides strong support for a link between dynamic capabilities at the macro level and performance. While the study of the micro-foundations of dynamic capabilities is important, relationships to performance are not shown. This study concludes by highlighting the link between personality and dynamic managerial capabilities, the macro dynamic capability of learning and performance and the need to explore in greater detail the linkages between micro and macro dynamic capabilities within the firm as a next step.

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Appendices

Appendix A: Recruitment Advert

INNOVATIVE STUDY: CEOS and Top Management Teams required to participate in an innovative study at Leeds Business School. A great chance to contribute to an understanding of an up and coming area: dynamic capabilities. In particular, emphasis in the research is placed upon understanding the ways in which dynamic capabilities such as knowledge absorption and learning can help your firm to sustain a competitive advantage in increasingly volatile and turbulent business environments. Participants will be required to carry out two questionnaires: one NEO personality assessment and one team dynamics questionnaire. All participants involved in the study will receive detailed, individualised personality feedback and the executive findings of the study. Please contact S.Knight@leeds.ac.uk to get involved or for more details.

EMAIL TO PARTICIPANTS:

Dear [e.g. director of Human Resources]

My name is Shelley Harrington and I am a PhD researcher at Leeds University Business School. My research is about understanding the link between the personality of key decision makers in the firm and the ability of firms to gain and sustain a competitive advantage in increasingly turbulent business environments. Dynamic capabilities are increasingly argued to promote superior firm performance and this research seeks to explore the core mechanisms, which support their development. This is therefore a great opportunity to gain free consultancy to help your firm understand how and where to create the capabilities, which have been shown to facilitate sustained competitive advantage.

I'd like to invite you and your senior colleagues to participate in my online study which comprises of two questionnaires. Both assessments will have a low impact on your time and all participants will receive individualised assessment feedback based upon the tool considered to be the gold standard of personality assessment. This is an innovative study as no one before has measured the creation of dynamic capabilities.

I hope this will be of interest to your firm, if you would like to participate whilst there are still places available please get in contact.

I look forward to hearing from you,

Best Wishes,

Shelley Harrington

Doctoral Researcher in Strategic Management and Organisational Behaviour.

Leeds University Business School

07411629587

Appendix B: NEO PI-3 Sample Scale Items²**Neuroticism N1: Anxiety**

I often feel tense and jittery.

I'm seldom apprehensive about the future.

I have fewer fears than most people.

Extraversion E1: Warmth

I really like most people I meet.

I have strong emotional attachment to my friends.

I take a personal interest in the people I work with.

² NEO PI-3

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Appendix C: Certification to carry out personality assessments.

Appendix D: Sample Development Report

Individual Planning Report by PsyPro Corporation and PAR Staff

Client Name:

Client ID: -Not Specified-

Gender: Male

Birthdate: 03/08/1983

Age: 30

Test Date: 09/06/2014

Norms: Gender Specific, Adult

This report will help you to understand yourself better so you become more effective in your current situation and more prepared for future opportunities. The statements in the report are based on your pattern of scores on the NEO-PI-3. These scores have been interpreted by a team of management psychologists. Resist reading good or bad into any of the statements. Human characteristics can be good or bad, depending on situation or use. What may be an asset – strong assertiveness, for example – in one situation may prove a liability in another. Remember also that we do not always respond the same way to all situations, even though our tendency to act in consistent patterns may be strong. Therefore, you may want to visualize yourself in several different situations you normally face in your life. This might help to clarify apparent contradictions in the report. If parts of the report appear to be inaccurate or inconsistent, the possibility exists that in some instances you may not have thought about certain aspects of your behavior. If after reflection, the information still seems to be at odds with your experience, you may want to discuss the information with some people who know you well. *To receive the maximum benefit from this report, you will probably want to read it several times.*

Summary of Your Most Distinctive Characteristics *As you are aware, human characteristics have the potential to be both assets and liabilities. The trick always with truly distinctive*

characteristics is to recognize ways in which we can capitalize on their upside benefits while minimizing the effects of their downside potential. Understanding your distinctive characteristics will enable you to do things in a way that is most appropriate for the situation.

When Your Distinctive Characteristics Work to Your Advantage

Often too sensitive and reactive to stress, you are seldom overconfident in the face of a challenge. It is unlikely that you will bite off more than you can chew.

With a tendency to follow your impulses, you show few inhibitions and little undue rigidity. This permits you to respond to changing circumstances. You are probably a good member in a brainstorming group activity.

You are aesthetically sensitive, with

When Your Distinctive Characteristics Work to Your Disadvantage

Feelings of inadequacy can sometimes overtake you, particularly under stress. You may be too quick to become dependent on others and inefficient under pressure. You may hold yourself back needlessly.

In some instances, you are too self-indulgent and too quick to give in to your urges. At those times, you find it difficult to say no to your cravings and become susceptible to distractions. Working in a tightly-structured work situation, while personally uncomfortable, would probably be advantageous to you.

You may focus so strongly on the

a true appreciation of art and beauty. This might enable you to see many options for possible action.

form of things that you lose sight of practical necessity. You may focus on aesthetics at the expense of the bottom line. You might want to think about placing more importance on determining the cost effectiveness of your decisions and actions.

Typically optimistic, you expect to be successful. You are cheerful and high-spirited. This can serve to buoy up others when things are tough.

Your strongly positive attitude may seem insincere, unrealistic, and naive to some people. It may also cause you to overlook signs of danger. You might want to investigate more thoroughly the downside consequences of many of your proposed courses of action.

Naturally sympathetic, you emphasize the human aspects of situations. You are insightful of others and contribute to team play. More quickly than most, you may recognize the emergence of people problems, which then can be nipped in the bud.

Often overly concerned for others and their problems, you would increase your effectiveness by becoming more task-oriented in many instances. You may be tempted to bend the rules to benefit an individual, thus creating a feeling of unfairness among others. Your concern for others prevents you, at times, from taking timely action on your assigned tasks and may lead you to overlook poor performance and unacceptable

results on the part of others. Others are probably much stronger than you give them credit for. You risk enabling others so you probably need to give them more of a chance to demonstrate this strength on their own.

Prone to experience frustration and anger, you may serve as a good barometer of morale, workload issues, and other potential problems – as long as you express these feelings in appropriate ways. Situations where candor of expression is desirable would probably suit you well.

Tending to be quickly angered and easily frustrated, you may be seen by others as irritable and disagreeable. They may fail to heed your input as a result. Consider expressing your concerns in a way that is more acceptable to others.

This section describes your problem-solving and decision-making styles. No attempt has been made to determine your intellectual power or IQ. The inventory you took is not equipped to make such determinations. It does, however, provide insight as to how you think, solve problems, and make decisions.

Ability to Organize Your Thoughts You are typical of the average person in the degree of preciseness and organization you use to resolve problems. When facing a difficult problem, you have about as much staying power as your peers. Even so, your strong desires may sometimes undermine your judgment. Nonetheless, you try to balance the need for a quick decision with thoughtful deliberation in resolving problems.

Your Open-Mindedness and Creativity You are willing to entertain new ideas and solutions, but will not get carried away with curiosity or intellectual pursuits. You are about as imaginative as most people. You can entertain new ways of doing things while seeing the value of proven ideas and methods. You are usually aware of your strong emotions, and when they appear, your feelings may sometimes influence your decision making.

Your Confidence in Problem Solving After forming your conclusion, you are as willing to speak up as the average person. You believe you are as capable as most people and generally proceed confidently through problems with only an occasional doubt.

Your Planning, Organizing, and Implementation Skills *This section of the report discusses how you go about analyzing situations, determining an action plan, and implementing that plan.*

Your Orientation toward Action You will be quicker to experience frustration than will most people when things are delayed or are going in the wrong direction. You are active and energetic. Your pace, however, will be misinterpreted by some as being pushy. You may not take enough time to celebrate or reward accomplishments. You exhibit a balance between your desire for novelty and your comfort with routine. Moderately ambitious and achievement-oriented, you are as career-oriented as most people. You want to be successful, but will only push yourself so far to achieve success. You will discuss some issues in an open and frank manner, but at other times, you will be more guarded in expressing your true feelings. You may often prefer to compete than to cooperate. You can be unyielding and headstrong as well as aggressive and demanding. You will typically factor your concern for the well-being of others into your decision about how to approach a matter. However, at times, you will overdo this and let your concern for others' feelings unduly influence your approach to an issue. Usually

enthusiastic and optimistic, you often see more opportunities for action than causes for delay in the situations facing you.

Your Level of Competence and Conscientiousness You believe you are as competent and sensible as most people. Your sense of duty, responsibility, and commitment to your code of conduct is typical of most people. You are typical of the average person in your ability to carry out your assignments in a well-organized and methodical manner. You are reasonably cautious and deliberate in your approach to most things, although at times, you may act spontaneously. You are typical of most people in your ability to start difficult projects and to persevere in your efforts to complete the task at hand. You procrastinate and become distracted about as much as the average person.

Your Openness to Different Possibilities and Alternatives Your interest in exploring new ideas and your willingness to utilize new methods are representative of the average person. You are only moderately curious or inquisitive. Your approach to your work environment and your assignments will sometimes reflect your appreciation for artistic things. You often accept prevailing value systems, but you are also willing to consider new assumptions and new ways of looking at things.

Your Style of Relating to Others *Living in an interdependent culture, you can achieve your career goals only with the help and support of others. Effective human relations skills are essential for success in your work and life. Your patterns of relating to other people are discussed in this section of your report. Reflect on how your characteristics influence your interpersonal relationships. This report makes no value judgments about your style of working with other people. As in many situations, a style that proves to be an asset to good relationships in one situation may prove to be a liability in another. Reflect on how these characteristics influence the quality of different relationships in your life.*

How Outgoing You Are Your interpersonal style combines the mannerisms of a warm and friendly variety with those of a more reserved and cool nature. You enjoy the company of others, but also enjoy your alone time; your needs for social contact and privacy are evenly balanced. You sometimes take the lead, at other times let others do the talking. You often feel shy, socially self-conscious and lacking in smooth social skills. However, this is not always clearly evident. Some may see your shyness as aloofness.

How Accommodating You Are to Others You are not one to brag about your accomplishments, but you are willing to talk about them when appropriate. You are rather typical of most people in your degree of modesty. You are more aggressive than most people and would rather compete than cooperate most of the time. You usually face interpersonal conflicts directly and seldom back away from them. Characteristically, you are sensitive to the needs of others and interested in their well-being. You will usually recognize and be concerned about the human side of situations.

How Trusting You Are Toward Others You are usually about midway between skepticism and trust. You are willing to extend your trust to others, but do so with an average degree of caution. You are concerned about the well-being of others, but also factor in your own needs and concerns. At times, you willingly extend a helping hand, and on other occasions, you are more self-centered and reluctant to become involved in others' problems.

The Quality of Your Relationships You are fairly typical of most people in your ability to understand and accept others whose principles differ from your own. About as straightforward as the average person, you can be both open and guarded in your communications, depending upon the situation.

Your Personal Style *Each of us has a unique emotional signature to our personality. In this section of the report, your special combination of emotional qualities is discussed. Emotions are neither good nor bad. They can be assets or liabilities, depending as much on the situation as on the*

particular emotion you are experiencing. Reflect on these statements in relation to situations you have been in when emotional patterns, such as those presented here, have surfaced. Ask yourself which of these patterns have usually been assets in handling the situations you recall. Which patterns have been liabilities in handling them effectively?

Your Level of Emotion Your feelings are important to you. More than most people, you feel the highs and the lows. You listen to your feelings and use them to guide your decision making. You are apt to have difficulty controlling some of your urges and in some circumstances may act on impulse. You may be too quick to go directly and rapidly after what you want, even when you realize that you may later regret it. You have difficulty saying “no” to temptation and will often be seen by others as self-indulgent. Under some circumstances, you may become moody or sarcastic when you do not get your way. You like to keep busy. You are seen by most as an active, energetic, and fast-paced individual. You seek about as much excitement and stimulation as the average person.

The Patterns of Your Emotions You are more apprehensive than most people but will seldom be overwhelmed by your concerns. However, you will expend larger amounts of time and energy being concerned about events than will most people, and your behavior will often reveal this tension. Your judgment and the timing of your actions will sometimes be impaired by your undue concern about what might go wrong. You experience feelings of anger and frustration more readily than most people. You may have a low flash point and may at times brood over your feelings. Your periods of feeling discouraged are fairly typical of the experiences of most people. Your emotions seldom get stuck in a down frame of mind, and you deal with discouraging events as well as the next person. You may often feel inadequate in coping effectively with stressful situations. You can frequently feel vulnerable and hopeless under pressure and in need of help in order to resolve troublesome situations. Others will frequently view you as panicking too easily in your response to stressful events in your life or work. Particularly when under stress, you are apt to act impulsively.

Your Control of Emotions Your belief in your competency to deal effectively with work and life situations is fairly typical of the average individual. Moderately self-disciplined, you pursue your objectives with a moderate level of motivation and follow-through. You characteristically balance prudent deliberation with quick action.

Your Outlook on Life You are willing to question your rationale for some of your values while holding firmly to others. At times, you simply accept authority without question, but on other occasions, you will question conventional thinking. You appreciate art and beauty. Usually positive in outlook, you are generally happy and cheerful in your attitude towards most things. You tend to view the glass as half-full. This positive outlook, however, may sometimes be displaced by equally strong feelings of concern and apprehension.

Concluding Suggestions

This report represents a consensus interpretation of the meaning and possible implications of your scores on the NEO-PI-3. This report was developed by a team of management psychologists. Its sole purpose is to provide you with information regarding how you described yourself in the inventory, and, as a consequence, how others may perceive you. This report focuses on behaviors. We can change behavior if we choose to and if we are willing to work at the change. The report describes your performance on a single assessment instrument. To gain maximum benefit from it, this measure should be interpreted within the context of other factors and with the assistance of a trained professional. There will probably be many things in the report that make you feel good about yourself. There may be a few

things that concern you. That is to be expected. Everyone has some areas in which they are most effective and other areas that need improvement. Furthermore, a strength in one situation may be a weakness in another. For example, aggressively pushing for what one wants may lead to success in one situation, but fail in another. As a consequence, we recommend the report be interpreted and applied within the context or environment in which you currently function, or desire to function. This report does not pretend to be 100% accurate, nor should it be taken as an absolute – all measurements contain some error. Furthermore, people can and do change. Use what is helpful to you. Reflect on ways you can leverage qualities that will support you in achieving your goals. Reflect on ways you might compensate for qualities that may impede your progress toward your goals. Occasionally, you may see statements in this report that do not appear to be totally consistent with each other. This is likely to occur if you have an unexpected combination of scores. Consider sharing this picture of yourself with trusted friends or coworkers, especially those findings that surprise you or those with which you take issue. This report is designed as a tool for your growth; use it for your benefit.

Next Steps This section is designed to help you make the most of this report. Some of you will know exactly what to do with this information. For these people, the next steps are clearly obvious. Others of you, however, may be uncertain how to best utilize this information about yourself. In a few cases, some people may even feel overwhelmed by it. Regardless of which of these cases best describes you, you might find the following suggestions to be helpful in gaining maximum benefit from your report.

If you are uncertain about or disagree with some of the information, we suggest that you reflect on those specific areas, searching through a wide variety of situations in your past where the “troublesome” descriptions might fit. If you find any of these, contrast these with other situations where you have behaved differently from how the report has described you. You might also consider discussing these aspects of your report with someone who knows you well. Remember that a recurring theme in your report is that behavioral patterns are not intrinsically good or bad. Every characteristic has the potential to be both. Pay particular attention to the concluding sections of your report where your most distinctive characteristics are summarized. Reflect on how you can reinforce the upside potential of your most distinctive

qualities while also thinking about what steps you can take to minimize the effect of their downside potential. As you read your report, frequently ask yourself, "What is the significance of this information relative to my personal and career development? What type of assignments am I best suited for? In what type of work environment am I most likely to be successful and satisfied?"

Appendix E: Participant Information Sheet

RECRUITMENT: INFORMATION SHEET and EMAIL.

Invitation to participate: team dynamics and the creation of capabilities.

Dear participant,

I'd like to invite you to participate in my research which looks specifically at the creation of capabilities within the Top Management Team. As you are part of the Top Management Team within an identified firm (those from within the technology and finance sector) there is a good opportunity to explore how you collectively work within the team. In particular, I am interested in understanding how the Top Management Team are able to create unique capabilities (i.e. learning, innovative decision making etc.) to secure competitive success. This is particularly important in increasingly dynamic and competitive business environments.

What's involved?

The research will involve you completing a NEO PI-3 questionnaire, the gold standard of personality instruments, and one short questionnaire looking at the dynamics of the Top Management Team. Both questionnaires will be administered online, so you will be able to complete them at your convenience

and the questionnaires will take no longer than 35 minutes to complete. I will also need consent from the full Top Management Team which I will facilitate to ensure that full team dynamics are captured. The data collected from the questionnaires will be used to analyse the relationship between group personality and the creation of capabilities within the organisation under the influence of the personality of the CEO.

Confidentiality

All the information you provide will remain strictly confidential. Whilst I will have access to your individual personality reports, all data will be anonymised upon collection and stored in an encrypted manner. I can ensure you that no personal details will be referred to in the write up of the research or any future publications.

Benefit to you?

In return for your participation, I am able to offer, on completion of all the questionnaires, substantive written feedback on your personality profiles. All participants will receive a detailed, personalised personality report which will talk you through the key facets of your personality and the meaning behind the results. In addition, upon completion of the data analysis, all participants will receive a copy of the executive findings of the research. The personality questionnaire you will complete is considered to be the 'gold standard' in personality measurement due to the fact it is well validated and researched. The feedback you will therefore receive will offer a credible basis for future reflection and development. Moreover, in recognition that business environments are becoming increasingly competitive and unpredictable, this research will offer an insight into how firms can compete on the basis of unique capabilities. The basis of a competitive advantage therefore rests upon the ability of a firm to create those capabilities which a firm which are difficult to be imitated or replicated by

others. The research you will be involved in will therefore shed light on the importance of understanding individuals within the firm and, the importance of creating a learning culture to move the organisation forward. This is therefore your chance to be involved in a highly innovative study shedding light on an increasingly important area of strategic management.

I do hope you will agree to take part in my research and in doing so, contribute to the understanding we have as to the way in which the Top Management Team create valuable platforms for competitive success. You are free to decline this invitation and even if you do agree you can pull out of the research at any time. If on the other hand you would like to participate please complete the attached consent form and return it to me over email or my mail and I will send the personalised questionnaire links out to you. Alternatively, if you require any more information please do not hesitate to get in touch.

Many thanks, Shelley Harrington

Appendix F: TMT questionnaire

PAGE ONE

Note that once you have clicked on the **CONTINUE** button your answers are submitted and you cannot return to review or amend that page.

PAGE TWO

The statements below have been designed in order to understand the way in which members of the Top Management Team work together to manage opportunities within their business environment. Please answer all statements with reference to the activities of the Top Management Team you work within. For each statement, you will be given the following seven options:

- a. Totally Disagree

- b. Disagree
- c. Partly Disagree
- d. Neither Agree nor Disagree
- e. Partly agree
- f. Agree
- g. Totally Agree

Please note that all data will be treated in the strictest confidence and will only be treated at the aggregate level. No individual names or companies will be referred to in the write up of the research or any publications emanating from the research.

Note that once you have clicked on the CONTINUE button your answers are submitted and you can not return to review or amend that page.

1. Please enter your full name. Answers will only be used to match the responses given here to your personality assessments. All responses given are only made known to the researcher and will be anonymous in the final write up of the research or any publications resulting from the work.
2. As a team we anticipate how our competitors might respond to our strategic actions.
3. As a team we specifically identify the causes of problems before making important strategic decisions.
4. As a team we are effective in utilising knowledge into new product/service development.
5. Staying up to date with new technologies is important for our team.
6. As a team we frequently scan the environment to identify new business opportunities
7. As a team we systematically observe and then evaluate the needs of our customers.
8. As a team we respond quickly to our competitors.
9. As a team we have effective routines in place to identify value and import new information and knowledge.
10. Within the team we believe that unstable, rapidly changing environments provide more opportunity than threats.
11. As a team, in order to identify possibilities for new services, we use different information sources.
12. Within the team we formally monitor our product quality: where it is good and where it needs improvement.
13. As a team we periodically review the likely effect of changes in our business environment on customers.

14. As a team we often let someone else break new ground and only move into a market once it has been proven profitable.
15. As a team we regularly seek to align external and internal innovation processes.
16. As a team we use acquisition as a strategy for managing threats in the external environment.
17. As a team we are more reactive than proactive
18. As a team we adapt on the basis of recent experiences
19. As a team we actively promote an alignment between the internal and the external environment.
20. As a team we look for information within the external environment.
21. As a team we devote a lot of time implementing ideas for new products and improving our existing products.
22. Within the team, when we see a business opportunity, we can seize that opportunity quicker than our competitors can.
23. As a team, we place strong emphasis on research and development, technological leadership and innovation.
24. Within the team our number one priority is lowest cost relative to our competition.
25. As a team we are effective in transforming existing information into new knowledge.
26. As a team we follow which technologies our competitors use.
27. Within the team we offer each other feedback on a regular basis.
28. As a team we actively align with firms we have acquired in order to enhance the transfer of knowledge, capabilities, and resources.
29. As a team we have trouble developing and maintaining relationships with external partners.
30. As a team we seek advice from all the firm's functional areas when making important strategic decisions.
31. As a team we often review our product development efforts to ensure that they are in line with what the customers want.

CONTINUE BUTTON

Many thanks for completing the questionnaire; your responses are highly valued.

Appendix G: Middle Management Learning Questionnaire

Page One:

Welcome to the questionnaire. Thank you for agreeing to take part. The questionnaire should take no more than 10 minutes and consists of 25 statements in total.

If you submit your answers you will not be able to return to this page.

The statements below have been designed in order to understand the way in which learning takes place within your firm. All responses given are anonymous and are treated at the aggregate level only. Thank you for your participation.

For each statement please choose one of the following options:

Strongly Agree

Agree

Partly Agree

Neither Agree nor Disagree

Partly Disagree

Disagree

Totally Disagree

1. Please enter the name of the organisation you work for. This is entirely for identification purposes only. Any responses you give to the following statements will be anonymous.

2. We have specific mechanisms in place within the firm for shared lessons learned in organisational activities from department to department (unit to unit, team to team).

3. The Top Management Team repeatedly emphasise the importance of knowledge sharing in our company.

4. All parts that make up this firm (departments, sections, work teams and individuals) are well aware of how they contribute to achieving the overall objectives of the firm.

5. The firm place emphasis on enhancing the learning capabilities of individual employees.

6. In this firm, innovative ideas that work are rewarded.

7. Experience and ideas provided by external sources (advisors, customers, training firms etc.) are considered a useful instrument for the firm's learning.
8. The firm's management looks favourably upon carrying out changes in any area to adapt to and/ or keep ahead of new environmental situations.
9. We always analyse unsuccessful organisational endeavours and communicate the lessons learned widely.
10. Employee learning is considered to be more of an expense than an investment within the firm.
11. Employees have the chance to talk amongst themselves about new ideas, programmes, and activities that might be of use to the firm.
12. The firm follows what other firms in the sector are doing; adopting those practices and techniques it believes to be useful and interesting.
13. Part of the firm's culture is that employees can express their opinions and make suggestions regarding the procedures and methods in place for carrying out tasks.
14. In this firm, teamwork is not the usual way to work.
15. We put little effort into sharing lessons and experiences across the firm.
16. The firm has instruments (manuals, databases, files, organisational routines etc.) that allow what has been learnt in past situations to remain valid, although the employees are no longer the same.
17. All employees have generalised knowledge regarding the firm's objectives.
18. All parts that make up this firm are interconnected, working together in a coordination fashion.
19. There is a good deal of organisational conversation that keeps alive the lessons learnt from history.
20. Errors and failures are always discussed and analysed in the firm, on all levels.
21. The firm promotes experimentation and innovation as a way of improving the work processes.
22. The top management team frequently involve their staff in important decision making processes.

Learning as a result of a strategic alliance or a strategic acquisition.

The final three statements refer to learning after a strategic alliance or acquisition.

23. The company have learnt or acquired some new or important information from the partner.

24. The alliance/acquisition has helped the company to enhance its existing capabilities or skills.

25. The company learnt or acquired some critical capability or skill from the partner.

Appendix H: Definitions Given to Q-Sorters

Sensing is the identification and assessment of opportunities.

Seizing is the mobilization of resources internally and externally to address opportunities and to capture value from doing so.

Transforming is the continual renewal of the organisation.

Appendix I: Facet Level Correlations

Appendix J: Domain norms/means for the NEO PI-3.

Neuroticism	Extraversion	Openness to Experience	Agreeableness	Conscientiousness
M = 43.0	M=55.5	M = 52.8	M = 53.4	M = 54.1

